NATHÁLIA BRANDOLIM BECKER

QUALIDADE DO SONO EM PESSOAS IDOSAS:
IMPLICAÇÕES NA QUALIDADE DE VIDA E NA PREVENÇÃO DA DEPRESSÃO

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FACULDADE DE CIÊNCIAS HUMANAS E SOCIAIS

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Doutoramento em Psicologia

Trabalho efetuado sob a orientação de:

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UNIVERSIDADE DO ALGARVE

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Declaração de Autoria de Trabalho

Eu, Nathália Brandolim Becker, declaro ser a autora deste trabalho, que é original e inédito. Autores e trabalhos consultados estão devidamente citados no texto e constam da listagem de referência incluída.

Esta investigação foi suportada pela Bolsa de Doutorado Pleno no exterior atribuída pela Coordenação Aperfeiçoamento de Pessoal de Nível Superior (CAPES), sob o nº 1990-15-2, do Ministério da Educação do Brasil.

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RESUMO

A literatura atual demonstra que a depressão tem uma relação bidirecional com a pobre qualidade do sono e afeta negativamente a vida de muitas pessoas, sendo que mais do que 45% da população mundial apresenta problemas do sono. O sono é parte essencial da saúde e o bem-estar do idoso tem-se tornado um desafio na saúde pública. O objetivo desta tese foi explorar a qualidade do sono em pessoas idosas a fim de verificar as suas implicações na qualidade de vida, descrevendo o modo como esta temática pode permear a prevenção da depressão. Foram realizados cinco estudos, sendo um de revisão da literatura, um de meta-análise, e três empíricos. Os resultados demonstraram que o efeito da depressão na qualidade de vida é mediado pela qualidade do sono; otimismo é mediador da relação entre a pobre qualidade do sono na qualidade de vida e na satisfação com a vida; além disto, é necessária uma atenção especial para o "uso de medicamentos para dormir" na população idosa portuguesa quando avaliada a qualidade do sono. Portanto, conclui-se que é necessário utilizar os resultados aqui apresentados para planear e investigar a eficácia e a viabilidade de uma intervenção que promova a higiene do sono e a boa qualidade do sono, atuando de forma a prevenir a depressão.

Palavras-chave: Depressão; Idoso; Qualidade de vida; Qualidade do sono; Satisfação com a vida.

ABSTRACT

Current literature shows that depression has a bidirectional relationship with poor sleep quality and negatively affects the lives of many people, with more than 45% of the world population experiencing sleep problems. Sleep is an essential part of health and the well-being of the elderly has become a public health challenge. The aim of this thesis was to explore the quality of sleep in the elderly in order to verify their implications on quality of life, describing how this theme can permeate the prevention of depression. Five studies were carried out, where the first one was a literature review, the second consisted in an meta-analysis, and in the other three were empirical studies. The results demonstrated that the effect of depression on quality of life is mediated by sleep quality; Optimism mediates the relationship between poor quality of sleep in quality of life and satisfaction with life; In addition, special attention is needed for "use of sleeping pills" in the Portuguese elderly population when the quality of sleep is assessed. Therefore, it is concluded that it is necessary to use the results presented here to plan and investigate the efficacy and feasibility of intervention that promotes sleep hygiene and good quality of sleep, acting in a way to prevent depression.

Keywords: Depression; Old adults; Quality of life; Satisfaction with life; Sleep quality.

ÍNDICE

1. INTRODUÇÃO

A denominação para idoso provém do latim *aetas,* que significa "o que tem muita idade". É possível utilizar diversas expressões para se referir às pessoas de maior idade: velho, ancião, idoso, sénior, e ainda a expressão 'adulto idoso' - supõe que o adulto já terminou a sua fase de crescimento (Oliveira, 2010). A ciência que estuda os idosos é a Gerontologia, a qual se ramifica nas ciências biológicas (biologia, medicina, enfermagem), ciências psicológicas (designadamente psicologia do desenvolvimento do idoso, psicologia social, psicologia cognitiva) e ciências sociais (sociodemografia, ecologia humana, etc.); e estuda o processo de envelhecimento sob a perspetiva biopsicossocial (compreendendo a pessoa do ponto de vista biológico, psicológico e social) em ordem a um maior bem-estar dos idosos (Oliveira, 2010).

O envelhecimento pode ser explicado ou compreendido através de diversas ciências. A nível biológico, o envelhecimento está associado ao progressivo acumular da ampla variedade de deterioração celular e molecular (Steves, Spector, & Jackson, 2012; Vasto et al., 2010). No decorrer do tempo, esta deterioração leva a diminuição gradual das reservas fisiológicas, aumento da probabilidade de desenvolver doenças, e redução geral das capacidades da pessoa (World Health Organization, 2015). Papalia & Feldman (2010) relatam que existem dois processos a serem considerados no envelhecimento: 1) Envelhecimento Primário, em que o envelhecimento é compreendido como um processo gradual e inevitável de deterioração física que começa cedo na vida e continua durante toda ela, não importando o que se faça para evitar. O processo ocorrerá de forma semelhante, gradual e progressiva, nos indivíduos da mesma espécie, sendo que a pessoa estará sujeita à influência de uma diversidade de fatores determinantes para o envelhecer, como por exemplo, alimentação, educação, estilo de vida, posição social, embora as causas sejam distintas; 2) Envelhecimento Secundário, em que o envelhecimento é resultante das interações e influências do ambiente externo, ou seja, consequências de doença, abuso ou ausência de uso, fatores que as pessoas podem ter controlo, podendo assim evitar os efeitos secundários do envelhecimento.

No entanto, as mudanças não acontecem linearmente e são, apenas levemente, associadas com a idade em anos (Steves et al., 2012). Deste modo, enquanto algumas pessoas de 75 anos podem desfrutar de um bom funcionamento físico e mental, outras podem ser mais frágeis ou necessitam de assistência para ter as necessidades básicas supridas. Isto pode ocorrer porque os mecanismos de envelhecimento são aleatórios e essas mudanças são fortemente influenciadas pelo ambiente e comportamento da pessoa (World Health Organization, 2015). Para além disso, de forma a evidenciar a diferença individual como determinando no envelhecimento, podemos ainda referir a idade funcional, a qual considera a capacidade de uma pessoa para interagir num ambiente físico e social em comparação com outros da mesma idade

cronológica (Papalia & Feldman, 2010). Portanto, o envelhecimento que cada pessoa apresentará relacionar-se-á com as variações de características como sexo, herança genética, estilo de vida, saúde, fatores socioeconómicos e influências constitucionais (Shephard, 2003), demonstrando que não há homogeneidade na população de adultos mais velhos.

Para sistematizar as teorias sobre o envelhecimento biológico é possível enquadrá-las em duas categorias, segundo Papalia & Feldman (2010): *as teorias de programação genética* (i.e. teoria da senescência programada, teoria endocrinológica, e teoria imunológica), em que o envelhecimento biológico é explicado como resultado de um programa de desenvolvimento geneticamente determinado; e, *as teorias de taxas variáveis* (i.e. teorias do desgaste, teoria dos radicais livres, teoria da taxa de metabolismo e teoria autoimune), em que o envelhecimento biológico é explicado como resultado de processos que variam de pessoa para pessoa e que são influenciados tanto por fatores internos como por fatores externos; por vezes são também chamadas de *teorias de erro*. Aparentemente, cada uma das teorias é capaz de apresentar parte da verdade, pois enquanto a programação genética é capaz de delimitar a duração máxima da vida, os fatores ambientais e de estilo de vida são capazes de afetar o quanto a pessoa poderá aproximar-se do máximo da idade e em que condições.

Além das perdas biológicas, a idade avançada envolve outras alterações significativas, como mudanças nos papéis e posições sociais. Outro autor que aponta as fases do envelhecimento é Lidz (1983 *apud* Oliveira, 2010), que objetiva o processo em três principais fases: a primeira é o *idoso*, em que ainda não existem grandes alterações psicossomáticas, pelo que a pessoa, mesmo depois da reforma (aposentadoria), sente-se válida; a segunda é a *senescência*, em que já há modificações significativas orgânicas e psicológicas, deixando o indivíduo de se bastar totalmente a si mesmo; e, a terceira é a *senilidade*, em que o idoso torna-se quase que totalmente dependente.

Desta forma, os adultos mais velhos tendem a selecionar menos metas e atividades, apesar de mais significativas, bem como a otimizar as suas habilidades já existentes através da prática e da utilização de novas tecnologias, compensando as perdas de algumas habilidades e encontrando novas maneiras de realizar as tarefas (Baltes, Freund, & Li, 2005). Aparentemente, os objetivos, as prioridades e as motivações parecem mudar (Carstensen, 2006). Embora essas alterações possam ser conduzidas através de adaptações às perdas sofridas, outras refletem o desenvolvimento psicológico em curso na idade mais avançada, que pode ser associado ao desenvolvimento de novos papéis, pontos de vista e muitos contextos inter-relacionados (Baltes et al., 2005; Dillaway & Byrnes, 2009). Estas alterações psicossociais podem explicar o motivo

pelo qual, em muitos contextos, a idade mais avançada pode ser um período de bem-estar (Steptoe, Deaton, & Stone, 2015).

No entanto, há aqueles que não conseguem adaptar-se às mudanças inerentes a esta fase da vida e podem apresentar momentos de crise. A crise pode ser caracterizada quando a pessoa não encontra uma solução para um problema adaptativo, i.e., a pessoa se vê "frente a uma situação totalmente nova e vitalmente transformadora, exigindo desse sujeito um novo padrão de comportamento. Assim, o novo exige um ato criativo" (Simon, 1989, p. 58). Além disso, a crise é classificada conforme o seu fator de origem, que pode ser pelo sentimento de perda (crise por perda, ou expectativa de) ou pelo aumento de suprimentos básicos, gerando tensão crítica (crise por aquisição, ou expectativa de). Nessa classificação, ambos os fatores mencionados têm em comum a angústia diante do novo e do desconhecido. Nas crises por perda, os sentimentos predominantes são depressão e culpa, havendo o risco de o indivíduo tentar avaliar-se por autoagressão, ou projeção da culpa em alguém menos resistente. Nas crises por aquisição, os sentimentos predominantes são insegurança, inferioridade e inadequação; nesta condição os riscos são de fuga direta, fuga indireta ou admitir mais do que pode, por arrogância e voracidade (Simon, 1989).

Além dos fatores internos, a crise também pode ser deflagrada por fatores ambientais, positivos ou negativos, que se relacionam e criam uma dinâmica com a personalidade do sujeito, resultando em mudanças que afetarão a eficácia da adaptação, aumentando-a ou diminuindo-a (Simon, 1989). Compreender esse funcionamento no processo de envelhecer, com ou sem crise, possibilita apreender o foco da dificuldade existente para posteriormente elaborar ações eficazes para pessoas, individualmente ou em grupo. Algumas investigações identificaram estereótipos a respeito dos idosos, os quais eram vistos como pessoas doentes, infelizes, improdutivas, necessitadas de ajuda, conservadoras, iguais a outros velhos, sofredoras de isolamento e de solidão (Berger, 1995). Assim, quer o idoso, quer a sociedade, podem ajudar a construir o envelhecimento criativo, não apenas desmistificando, mas promovendo de diversos modos as suas capacidades e criando uma cultura de respeito pelos anciãos, ao mesmo tempo que cuidam mais da sua saúde física e psíquica (Oliveira, 2010).

A necessidade de cada vez mais abordar o envelhecimento está relacionada com as atuais perspectivas de que a população mundial está, cada vez mais, composta por adultos mais velhos. Neste sentido, a Organização Mundial da Saúde (World Health Organization, 2015) reportou através de "*World report on Ageing and Health*", que nas próximas décadas (i.e. até 2050), a população mundial acima de 60 anos terá aumentado dos atuais 841 a 2.000 milhões, tornando o bem-estar dos idosos um novo desafio em saúde pública global. Estima-se ainda

que, em 2020, pela primeira vez na história, o número de pessoas com mais de 60 anos de idade será maior do que o de crianças com até 5 anos de idade (World Health Organization, 2015). Estes dados são preocupantes a nível mundial e apresentam-se de caráter emergencial de ação com esta população. Infelizmente, o número crescente de pessoas idosas não é acompanhado pelos serviços públicos, que deveriam estar prontos para exercer cuidados efetivos (World Health Organization, 2015).

Deste modo, o problema na saúde pública reportado pela Organização Mundial de Saúde está diretamente relacionado com o facto de os idosos viverem mais anos do que antigamente, mas não necessariamente com qualidade, dependendo de medicações e cuidados médicos e assistenciais durante um longo período de tempo das suas vidas (World Health Organization, 2015). Numa perspectiva global, as necessidades deverão focar-se na modificação da maneira de entender o envelhecimento, estimulando o desenvolvimento de novas abordagens de tratamento e fortalecendo a capacidade de assistência às pessoas mais velhas na adaptação ao ambiente em mudança (World Health Organization, 2015). No entanto, o foco atual reporta a necessidade de mudança do uso do modelo de doença, em que a característica principal é a reparação de danos (doença), dando quase que total atenção à patologia e não ao indivíduo (Seligman & Csikszentmihalyi, 2000). A fim de mudar o cenário exposto surge, através da Psicologia Positiva, o objetivo de "catalisar uma mudança no foco da Psicologia, da preocupação apenas com a reparação das piores coisas na vida, mas também a construção de qualidades positivas" (Seligman & Csikszentmihalyi, 2000, p. 6).

A Psicologia Positiva tem oferecido uma nova abordagem para a promoção da saúde (Kobau et al., 2011) que é caracterizada pela necessidade de alterar a forma como o envelhecimento é entendido, exposta pela Organização Mundial de Saúde. As promoções da saúde incluem, atualmente, a execução de políticas de melhoria da saúde pública, criando ambientes favoráveis e apoiando a ação da comunidade, o desenvolvimento de habilidades pessoais, e a reorientação dos serviços de saúde, para que possam existir melhorias (Wolrd Health Organization, n.d.). Portanto, os esforços em saúde têm sido direcionados para a prevenção física de doenças, lesões e deficiências, aumentando a longevidade das pessoas (Centers for Disease Control and Prevention., n.d.). No entanto, têm-se observado mudanças no que diz respeito à promoção da saúde mental através da Psicologia Positiva e, consequentemente, da saúde mental positiva, recurso que capacita amplamente habilidades e recursos psicológicos para o bem-estar psicológico das pessoas (Herrman, Saxena, & Moodie, 2005; Jané-Llopis, Barry, Hosman, & Patel, 2005) e que é promovido através de atividades e programas.

Resultados de investigações que utilizaram intervenções e métodos da Psicologia Positiva com idosos demonstraram efeitos positivos sobre o bem-estar e também na redução da ansiedade e depressão (Ho, Yeung, & Kwok, 2014; Proyer, Gander, Wellenzohn, & Ruch, 2014; Ramírez, Ortega, Chamorro, & Colmenero, 2014). Além disso, tem sido sugerido em estudos que o bem-estar subjetivo pode até ser um fator protetor da saúde, reduzindo o risco de doenças crónicas e promovendo a longevidade (Steptoe et al., 2015). Alguns pesquisadores têm relatado ainda que o bem-estar deve ser tratado como uma medida de avaliação da saúde e, deve ser considerado como destino de parte dos recursos de cuidados de saúde (Dolan & White, 2007).

As investigações sobre o bem-estar subjetivo e saúde em pessoas mais velhas ainda está em estágio inicial (Steptoe et al., 2015). No entanto, o assunto sobre o bem-estar no idoso, bem como todas as variáveis que podem ser compreendidas ativamente dentro do que abrange o bem-estar na Psicologia Positiva, são relevantes para a saúde e para a qualidade de vida. Nunca antes foi tão demonstrado que os sistemas de cuidados de saúde necessitam de se preocupar não só com a doença e a incapacidade, mas também com o apoio a ações/métodos que auxiliem o desenvolvimento de estados psicológicos positivos (Steptoe et al., 2015; World Health Organization, 2015).

Infelizmente, ensaios clínicos em grande escala para avaliar os efeitos dos esforços para aumentar o prazer na vida em idades mais avançadas ainda são prematuras; não sendo possível saber, até ao momento, se o bem-estar é passível de modificações por intervenções psicológicas, sociais ou económicas para testar os efeitos na saúde (Steptoe et al., 2015). Estudos com métodos para avaliação dos estados psicológicos positivos devem, ao longo dos próximos anos, aumentar a compreensão destes processos em pessoas mais velhas. Resumindo, o redirecionamento científico para a investigação de processos dos afetos positivos (Seligman & Csikszentmihalyi, 2000) poderá ser essencial para a promoção do bem-estar e qualidade de vida a longo prazo em idosos. Talvez assim, tomando um cuidado especial ao olhar para a boa saúde, a ciência possa ser capaz de avançar e contribuir efetivamente para a saúde das pessoas (Buysse, 2014).

Ao compreender a necessidade da promoção de saúde para as pessoas mais velhas, apresentam-se como parte essencial da saúde, o sono (Buysse, 2014). Na medicina, o sono é definido basicamente em termos de distúrbios do sono, e mais recentemente, como a deficiência do sono (Czeisler, 2011). Da mesma forma, noutras ciências o sono é evidenciado em aspectos da doença. Mas isto tem sido mudado aos poucos por diversos motivos, como por exemplo a redução de financiamentos em pesquisa, o que ameaça a execução de investigações básicas e

clínicas (Strollo et al., 2011). Contudo, nunca foi tão importante mostrar a razão de investigar o sono e muito mais questões relativas à saúde tornando possível a produção de conhecimentos que fundamentalmente são importantíssimos para a prática mais eficaz desde as prevenções até às intervenções e tratamentos.

O sono é um processo fisiológico vital, uma interação complexa entre os fatores orgânicos e fisiológicos - inerentes ao indivíduo - bem como entre os sociais, culturais e ambientais (Nunes da Silva et al., 2012). São caracterizados dois padrões fundamentais de sono: sem movimentos oculares rápidos (NREM) e com movimentos oculares rápidos (REM). As fases do sono incluem a vigília, as fases 1, 2, e 3 do sono NREM e o sono REM (Paiva & Penzel, 2011). Na *vigília* podem haver ou não movimentos oculares, rápidos ou lentos, existindo uma certa irregularidade na frequência respiratória. As fases NREM 1 e 2 são estágios superficiais, ou de transição para o sono em que os movimentos lentos dos olhos desaparecem e as frequências cardíaca e respiratória apresentam um valor médio menor do que na vigília. A fase NREM 3, antes subdividida em fases 3 e 4 do sono lento, tem agora a denominação de "sono lento profundo" e apresenta uma redução nas frequências respiratória e cardíaca e um certo relaxamento muscular, mantendo a tonicidade basal (Paiva & Penzel, 2011). No sono REM ou sono paradoxal, embora seja um estágio profundo no que diz respeito à dificuldade de despertar, o indivíduo exibe nessa fase um padrão eletroencefalográfico que se assemelha à vigília (Fernandes, 2006; Harrington & Lee-Chiong, 2007). Além disso, "ocorrem surtos com extrema variabilidade na amplitude, direção e composição de sequências. Paralelamente, há uma diminuição significativa e persistente do tono muscular, à qual podem sobrepor-se breves ativações fásicas" (Paiva & Penzel, 2011, p. 9). Em pessoas mais velhas, é possível observar a retomada do padrão bifásico (padrão observado nos primeiros anos de vida), com a sesta após o almoço. O sono paradoxal se mantém-se estável na velhice, mas o sono lento profundo e a eficiência do sono diminuem de forma significativa nesse período da vida (Paiva & Penzel, 2011).

Atuais investigações têm demonstrado que o sono também é um estado comportamental complexo. Apesar disso, os estudos e técnicas mais recentes já podem descrever e interpretar diversos mecanismos biológicos do sono (Carter et al., 2012; Siegel, 2011), avançando para além das descrições de patologias como também para processos que levam a reflexões acerca de como estabelecer uma boa qualidade do sono (Miró Morales, Cano Lozano, & Buela Casal, 2005).

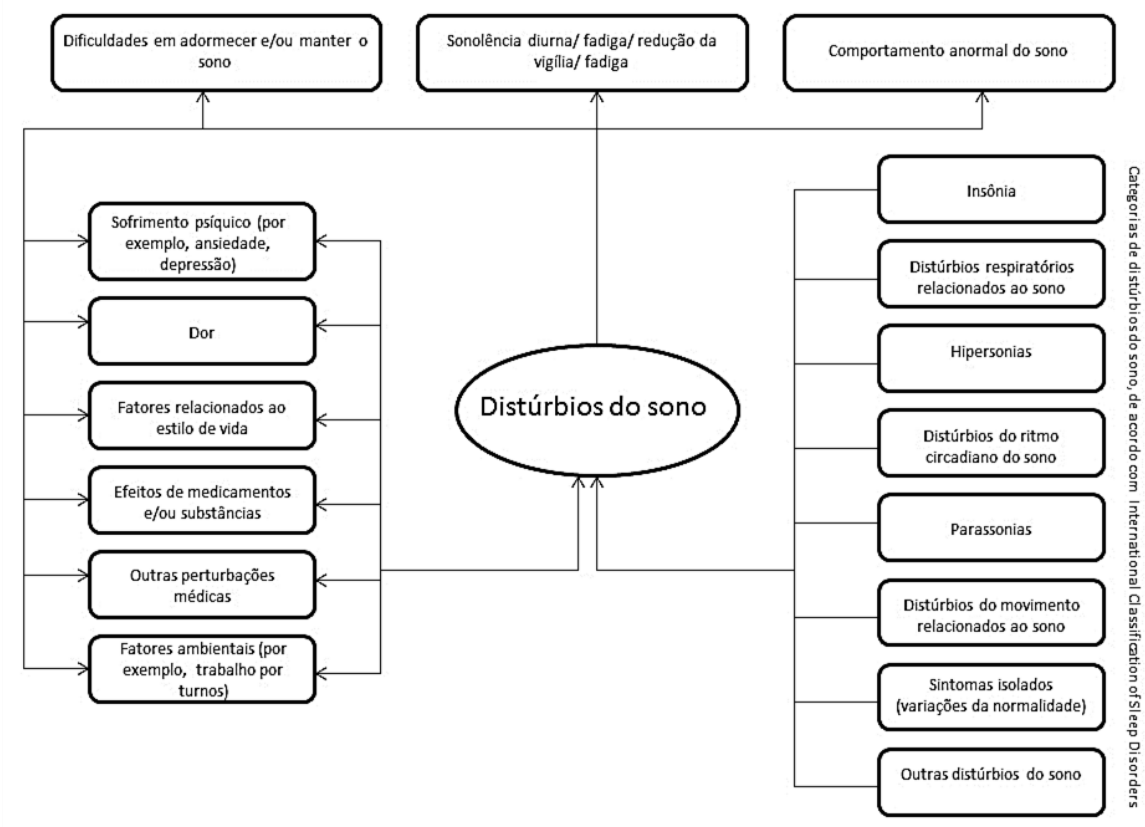

Figura 1. Modelo explicativo dos distúrbios do sono. Setas unidirecionais do constructo (ou seja, círculo) para itens (ou seja, retângulos) representam modelos reflexivos e dos itens do constructo – modelo formativo. Setas bidirecionais representam uma combinação de elementos refletivos e formativos. Traduzido de Molayeva et al. (2016).

A complexidade dada aos distúrbios do sono deve-se ao facto de que uma série de sintomas primários se sobrepõem a com fatores neurofisiológicos, psicológicos e comportamentais, exigindo diagnóstico e tratamentos direcionados (Mollayeva et al., 2016). Portanto, a noção de qualidade do sono é um modelo tanto reflexivo quanto formativo (Bassetti et al., 2012; Mollayeva et al., 2016). Apesar da complexidade dos distúrbios do sono, a maior parte destas perturbações são de fácil prevenção ou tratamento (WASM, 2016).

Os riscos associados com às perturbações do sono podem incluir doenças cardiovasculares, cancro e distúrbios metabólicos (Luyster, Strollo, Zee, & Walsh, 2012). Algumas investigações já estabeleceram também, a relevância do sono para os transtornos psiquiátricos (Baglioni et al., 2014; Benca, Obermeyer, Thisted, & Gillin, 1992). A pobre qualidade do sono e insónia estão relacionadas com a emoção, e estudos anteriores investigaram os efeitos da solidão, do luto, da hostilidade e da impulsividade sobre o sono (Baglioni, Spiegelhalder, Lombardo, & Riemann, 2010). Assim, a emoção e o sono têm apresentado uma

íntima conexão, sendo este assunto cada vez mais reconhecido como uma área de investigação importantíssima.

Tentando sanar a falta de abordagem sobre o sono na perspetiva da saúde, Buysse (2014) entende como necessário descrever definições para "saúde do sono", ainda que o volume de investigações que abordem o assunto seja escasso. A definição de "Saúde do Sono" é mais apropriada para adultos, mas pode ser adaptada para as diversas faixas etárias, expressando-a como um atributo positivo e é definido-a como:

> "*A saúde do sono é um padrão multidimensional do sono-vigília, adaptado às exigências individuais, sociais e ambientais, que promove o bem-estar físico e mental. A boa saúde do sono é caracterizada pela satisfação subjetiva, momento adequado, duração adequada, alta eficiência, e atenção mantida durante as horas de vigília"*.(Buysse, 2014, p. 12)

A definição reconhece que a saúde do sono é melhor compreendida no contexto de demandas individuais, sociais e ambientais, ou seja, que a boa saúde do sono pode não ter a mesma aparência em cada situação ou indivíduo (Buysse, 2014). No entanto, a escassez de trabalhos com o foco na saúde torna a discussão da temática ainda pouco explorada, obrigando-nos a abordar necessariamente também a doença (conhecimento que nos é exposto) para podermos compreender e desenvolver um diálogo com a saúde.

Evidências experimentais recentes apontam que o sono apresenta uma maior sensibilidade a estímulos emocionais stressantes ou negativos. Este facto pode ser observado em estudos de laboratório que demonstram que o sono inadequado e a sonolência diurna estão associados ao aumento da sensibilidade ao stresse e emoções negativas (Minkel et al., 2012), além de a uma maior reatividade fisiológica a estímulos negativos ou stressantes (Franzen et al., 2011; Franzen, Buysse, Dahl, Thompson, & Siegle, 2009; Yoo, Gujar, Hu, Jolesz, & Walker, 2007). Estas reações comprovaram-se, também, em situações rotineiras. Numa investigação com agentes policiais constatou-se que aqueles que tinham quaisquer distúrbios do sono eram mais propensos a ter raiva descontrolada em direção a um suspeito do que agentes livres de distúrbios do sono (Rajaratnam et al., 2011).

Novamente, a deficiência do sono não relacionada a um distúrbio do sono primário, mas associada a fatores biológicos, sociais, ambientais e de estilo de vida, é um fator determinante do estado de saúde. Neste contexto, as consequências são enormes a nível da sociedade. Isto porque incluem doenças, risco de acidentes, longevidade e consequentemente, elevados custos médicos diretos e indiretos envolvidos. Relativamente aos distúrbios do sono primários (i.e. apneia do sono, insónia, narcolepsia e síndrome das pernas inquietas), estes exigem muita atenção de toda a comunidade médica, pois a deficiência do sono representa uma oportunidade para que todos possam promover uma boa saúde, levando em consideração questões que geram uma curta duração do sono e a interrupção do ciclo circadiano (Luyster et al., 2012).

É indispensável para a saúde pública determinar os mecanismos subjacentes a esses efeitos adversos na incidência de deficiência de sono, bem como avaliar outras medidas destinadas a melhorar o sono e saúde em geral de indivíduos que sofrem de deficiência crónica do sono. Assim, é possível progredir na direção de três principais objetivos: 1. Reconhecer e cumprir a exigência biológica do sono com regularidade; 2. Aumentar a sincronia entre os sistemas de cronometragem biológicos endógenos; 3. Reconhecer os sinais e sintomas de distúrbios do sono primários e procurar atenção médica (Luyster et al., 2012).

Atualmente, diversos estudos epidemiológicos que avaliam o sono ao longo da vida (18 até mais de 65 anos de idade) relatam que o fator "idade" está associado a um aumento do número de queixas sobre o sono, incluindo dificuldades com a manutenção do sono e redução do número de horas (duração) do sono (Stein, Belik, Jacobi, & Sareen, 2008; Zeitlhofer et al., 2000). Ao mesmo tempo algumas investigações com adultos mais velhos (acima de 60 anos de idade), com amostras igualmente grandes, demonstram que os mais velhos não necessariamente apresentam uma pobre qualidade do sono, mas ao contrário estão satisfeitos com o seu sono quando o contexto das condições de saúde ligadas ao envelhecimento está controlado (Foley et al., 1995; Vitiello, Moe, & Prinz, 2002).

Existem muitos resultados que se contradizem em pesquisas acerca do sono em diversas idades. No entanto, um estudo recente de adultos com idades entre 18 e 80 anos descobriu que, os adultos mais velhos são menos propensos a relatar pior qualidade do sono e cansaço do que os adultos mais jovens (Grandner et al., 2012). Parte das razões para esses resultados, pode ser o fato de que pessoas mais velhas adaptam as suas expectativas sobre o seu sono à medida que envelhecem (Buysse et al., 1991; Zilli, Ficca, & Salzarulo, 2009). No entanto, devemos considerar a diferença entre os aspectos/instrumentos/população que foram utilizados nas investigações para a qualidade do sono.

Alguns estudos epidemiológicos têm usado o *score* global do questionário "*Pittsburgh Sleep Quality Index*" (PSQI) para demonstrar o declínio na qualidade do sono relativo à idade (Stein et al., 2008; Wong & Fielding, 2011; Zeitlhofer et al., 2000), apesar de alguns estudos sugerirem que o PSQI tem uma estrutura multidimensional que é melhor caracterizado por dois ou três fatores (Cole et al., 2006; Magee, Caputi, Iverson, & Huang, 2008). Assim, algumas associações específicas poderiam existir entre idade e fatores do sono PSQI, mas não considerando apenas o *score* total. Isto indica-nos que trabalhos referentes à caracterização do sono devem continuar a juntar esforços por ser um importante foco nos estudos sobre a qualidade do sono ao longo da vida.

Os fatores psicológicos, como depressão, também foram citados como fatores importantes que podem afetar a relação entre a qualidade do sono e idade. Roberts, Sema, & Kaplan (1999), demonstraram que a tendência para o aumento da perturbação do sono ao longo da vida (especificamente avaliada com sintomas de insónia e hipersónia) desapareceu quando níveis de humor negativo foram controlados. Este achado é consistente com estudos transversais e longitudinais que documentam a relação recíproca entre problemas do sono e problemas psicológicos, como a depressão (Krishnan & Hawranik, 2008; Sbarra & Allen, 2009; Taylor, Lichstein, Durrence, Reidel, & Bush, 2005; Walker & van der Helm, 2009).

A possibilidade de que problemas de sono em idosos sejam afetados diretamente por sintomas psicológicos existe. No entanto, um estudo de Grandner et al. (2012) é contrário ao facto de que a depressão pode ter impacto sobre a relação de qualidade do sono e idade. Ao ajustar os resultados para a depressão, os autores descobriram que as mudanças relacionadas com a idade na qualidade do sono permaneceram, ou seja, distúrbios do sono diminuíram, em vez de aumentarem, ao longo da vida, apesar de ter sido controlado o efeito para a depressão. Portanto, estes resultados sugerem que a depressão pode não ter um impacto direto sobre a relação entre a idade e a qualidade do sono. Poucos estudos examinaram o efeito da depressão, ou mesmo outros sintomas psicológicos, como ansiedade ou stresse, na qualidade do sono e idade (Doi, Minowa, & Tango, 2003; Hall et al., 2000).

É importante notar que a relação entre o sono, depressão, e idade é complexa. Alguns estudos relatam que a susceptibilidade à depressão tende a diminuir, em vez de aumentar, com a idade (Henderson et al., 1998; Jorm, 2000). Isso desafia a nossa compreensão de que a falta de sono em adultos mais velhos deve estar ligada a maiores níveis de depressão e sugere que poderiam existir diferentes associações entre depressão e sono em diferentes idades (Knowles & MacLean, 1990). No entanto, O'Connor (2006) propõe que, conclusões de uma aparente redução da prevalência de depressão em idosos pode ser devida a vieses de amostragem, de tal

forma que a depressão é, na verdade, altamente prevalente em indivíduos com idade equivalente (Fiske, Wetherell, & Gatz, 2009). A investigação sobre a qualidade do sono ao longo da vida deve levar em conta os possíveis efeitos dos sintomas psicológicos, como depressão, ansiedade e stresse. Portanto, esta é urgentemente necessária para o avanço do conhecimento nessa área.

No estudo de Mellor (2013), visou-se investigar as diferenças relacionadas à idade na qualidade do sono, avaliada através de *scores* do PSQI globais e os fatores controladores do PSQI para a depressão, ansiedade, stresse e risco de distúrbios respiratórios do sono (DRS). Além disso, o sexo foi controlado porque as mulheres tendem a relatar mais problemas de sono do que homens (Voderholzer, Al-Shajlawi, Weske, Feige, & Riemann, 2003). Os resultados sugerem que problemas do sono são comuns em toda a vida, e que houveram diferenças modestas relacionadas com a idade na qualidade do sono, os quais não se deviam ao humor deprimido, sexo ou risco de DRS.

Após perceber brevemente sobre os principais assuntos atuais do envelhecimento, e como se relacionam com a qualidade do sono e a psicologia positiva, chegamos a diversas lacunas. Fica claro que há a necessidade de pesquisas que possam englobar questões relativas à saúde das pessoas. Aparentemente, a compreensão da saúde pode ser um ideal utópico, pois não nos é possível compreendê-la sem considerarmos a doença. A definição de saúde na Constituição WHO (1946) nos diz que "a saúde é um estado de completo bem-estar físico, mental e social, e não consiste apenas na ausência de doença ou de enfermidade". Certamente não se trata de discordarmos desta definição, mas, de sermos capazes de compreendê-la efetivamente na prática. Assim, os discursos de investigadores, profissionais da medicina e da saúde, permeiam considerações exatamente opostas à definição; isto é, a pessoa que tem saúde é assim considerada quando se verifica que não há doenças diagnosticadas e os índices estão estabelecidos abaixo dos limites de alteração. Então, começamos a questionar como, na perspectiva da psicologia, seria possível abordar mais a saúde, mesmo que a partir do que já se conhece sobre a doença, mas, de uma perspectiva inovadora dentro da temática da qualidade do sono no envelhecimento.

1.1 Breve clarificação dos constructos

Nesta sessão será feita uma breve clarificação dos principais constructos abordados no intuito de descrever sinteticamente cada um para que seja possível compreender a maneira pela qual foram aplicados nos estudos.

Qualidade do sono

A qualidade do sono é um constructo clínico que representa um fenómeno complexo de difícil medição e definição (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989). Atualmente, a boa qualidade do sono é reconhecida como associada à saúde mental, bem-estar e vitalidade em geral. Embora, o termo "qualidade do sono" seja amplamente utilizado por pesquisadores, clínicos e público geral, a expressão ainda não possui consenso de definição (Ohayon et al., 2017).

A qualidade do sono inclui aspectos quantitativos do sono, tal como a duração do sono, latência do sono, ou o número de despertares, bem como aspectos mais puramente subjetivos, tal como a profundidade do sono (Buysse et al., 1989; Ohayon et al., 2017). Entretanto, os elementos exatos que compõem a qualidade do sono e sua importância relativa podem variar entre os indivíduos. Além disso, devido ao facto da qualidade do sono ser amplamente subjetiva, as medidas laboratoriais do sono podem correlacionar-se com a qualidade do sono percebida, mas não podem defini-la (Buysse et al.,1989).

Um dos mais recentes estudos que pretendeu estabelecer recomendações e orientações baseadas em evidências sobre indicadores de boa qualidade do sono em toda a vida, resultou no consenso para os seguintes indicadores: (a) latência do sono, (b) número de despertares >5 minutos, (c) despertares após o início do sono, e (d) eficiência do sono (Ohayon et al., 2017). Entretanto, a medição da qualidade do sono é afetada pelo tipo de estudo, nomeadamente o método, pelo qual é examinada. O índice de qualidade do sono de Pittsburgh (PSQI-PT) foi o instrumento que melhor correspondeu ao método de investigação utilizado nesta tese (João, Becker, Jesus, & Martins, 2017).

A abordagem de auto relato é uma alternativa de baixo custo que se tem demonstrado relevante nas investigações (Maglione, Ancoli-Israel, et al., 2012). Apesar das suas limitações, foi o instrumento mais completo passível de utilização no contexto estudado. O PSQI-PT propõem-se a avaliar a qualidade do sono durante o período de um mês. O questionário consiste em 19 questões de auto relato e cinco (5) questões que devem ser respondidas pelo (a) companheiro (a) de quarto. Estas últimas questões são utilizadas apenas como informação clínica e, assim sendo, não são tabuladas na pontuação. Portanto, as 19 questões são categorizadas em sete (7) componentes classificadas numa pontuação que varia de 0 a 3. As componentes são as seguintes: (a) qualidade subjetiva do sono, (b) latência do sono, (c) duração do sono, (d) eficiência habitual do sono, (e) distúrbios do sono, (f) uso de medicação para dormir, e (g) sonolência diurna e distúrbios durante o dia. A soma destas componentes produz uma pontuação global que varia de 0 a 2, onde as pontuações maiores que 5 indicam pobre

qualidade do sono, i.e. maiores dificuldades em duas componentes ou dificuldades moderadas em mais do que três componentes (Buysse et al., 1989; João et al., 2017).

Depressão

Segundo a Organização Mundial da Saúde (WHO,2017) a depressão é um transtorno mental comum, caracterizado por tristeza, perda de interesse ou prazer, sentimento de culpa ou baixa autoestima, sono perturbado ou apetite, sentimentos de cansaço e baixa concentração. Pode ser duradoura ou recorrente, prejudicando substancialmente a capacidade de um indivíduo funcionar no trabalho ou na escola ou fazer face à vida diária. Quanto mais grave, a depressão pode levar ao suicídio. Quando leve, as pessoas podem ser tratadas sem medicamentos, mas quando a depressão é moderada ou grave, pode ser necessário o uso de medicação e de tratamentos com um profissional especializado.

Há diversas fontes que definem, cada qual ao seu modo, a depressão de acordo com a finalidade pela qual a fazem. Entretanto, o nosso objetivo não é aprofundar este tópico a nível de conceptualização pois já há um sólido conhecimento estabelecido sobre essa desordem mental, apesar de ainda haverem algumas lacunas que estão a ser investigadas. A mais recente revisão sobre novas estratégias de tratamento da depressão descreve concisamente sobre aspectos do funcionamento fisiológico da doença (Huang, Lane, & Lin, 2017). Entretanto, os estudos que se seguem tentam compreender a depressão a fim de pensar na maneira pela qual é possível preveni-la, e o instrumento selecionado para avaliar a depressão foi a subescala de depressão da Escala de Ansiedade, Depressão e Stress - EADS-21 (Antony, Bieling, Cox, Enns, & Swinson, 1998; Pais-Ribeiro, Honrado, & Leal, 2004). Apesar da escala avaliar aspectos de ansiedade, depressão e stresse, interessa-nos apenas a depressão.

Nesta pesquisa, a depressão é caracterizada como perda de autoestima e motivação e está associada à percepção da baixa probabilidade de alcançar metas de vida que sejam significativas para o indivíduo (Lovibond & Lovibond, 1995). A escala foi desenvolvida pelo que o conceito (i.e. depressão) começou por ser definido em termos de consenso clínico e posteriormente foi refinado em termos empíricos nomeadamente com recurso a técnicas de análise fatorial. Este questionário é composto por 21 perguntas de autorelato, separadas em três escalas (depressão, ansiedade e stresse), com sete itens em cada escala classificados de 0 a 3. Os participantes avaliam o grau em que experimentam cada sintoma na semana anterior. Os resultados da escala de depressão são determinados pela soma dos resultados para os sete itens, onde o mínimo é 0 e o máximo 21. As notas mais altas na escala correspondem a estados emocionais mais negativos (Antony et al., 1998; Pais-Ribeiro et al., 2004).

A escala de Depressão inclui vários conceitos, nomeadamente, Disforia (dois itens); Desânimo, (dois itens); Desvalorização da vida (dois itens); Auto depreciação (dois itens); Falta de interesse ou de envolvimento (dois itens); Anedonia (dois itens); Inércia (dois itens). Portanto, a subescala de depressão mede os sintomas centrais da depressão, isto é, sintomas cognitivos da depressão. Em adultos mais velhos, os sintomas físicos e consequente emoção reativa para doenças físicas muitas vezes imitam sintomas vegetativos e afetivos de distúrbios depressivos. Assim, os sintomas cognitivos da depressão são altamente válidos e especificamente úteis para diferenciar a depressão patológica das pessoas idosas.

Qualidade de vida

A noção de qualidade de vida foi construída durante o percurso da humanidade e está relacionada com o contentamento quanto à vida pessoal, amorosa, social, como ao ambiente em que se vive e relativo à própria estética existencial (Minayo, Hartz, & Buss, 2000). Antigamente o termo 'qualidade de vida' foi usado para criticar as políticas públicas que tinham em vista o crescimento económico desordenado. Os críticos, ao utilizar o termo 'qualidade de vida', faziam-no com vista a expressar a preocupação com a qualidade das condições externas de vida. Entretanto, ao contrário da crença que os valores materiais eram centrais para a obtenção de uma boa vida, os críticos concebiam este cenário como uma "pobre boa vida". Após a II Guerra Mundial, a influência da ideologia assistencialista e utilitarista na política aumentou. Os objetivos da política social foram formulados noutros termos como 'felicidade', 'bem-estar' e 'qualidade de vida' (Musschenga, 1997).

Com o passar dos anos observou-se a necessidade de ampliar o conceito que teve reflexo nos indicadores, além das condições de saúde, educação, moradia, transporte, lazer, trabalho; agregaram-se mortalidade infantil, esperança média de vida, nível escolar, saneamento básico, níveis de poluição entre outras medidas objetivas (Scattolin, 2007). Contudo ainda era necessário que a qualidade de vida estivesse relacionada com o significado que o indivíduo fazia da mesma. Nesse sentido, a Organização Mundial da Saúde a partir do "The Whoqol Group" (1998, p. 1405) definiu qualidade de vida como "a percepção do indivíduo sobre a sua posição na vida, no contexto da cultura e dos sistemas de valores nos quais ele vive, e em relação aos seus objetivos, expectativas, padrões e preocupações".

A partir desta definição este mesmo grupo propôs os instrumentos utilizados para a avaliação da qualidade de vida nesta tese – WHOQOL-Bref e WHOQOL-Old. A primeira escala, WHOQOL-Bref (Vaz Serra et al., 2006; WHO, 1997), e é um questionário composto por 26 questões agrupadas em quatro domínios: (a) Saúde física [dor e desconforto, energia e fadiga, sono e descanso, mobilidade, atividades da vida diária, dependência de medicação e

tratamento e capacidade de trabalho]; (b) Psicológico [sentimentos positivos, pensamento sobre a aprendizagem, memória, concentração, autoestima, imagem e aparência do corpo, sentimentos negativos, espiritualidade, religião e crenças pessoais]; (c) Relações sociais [relacionamentos pessoais, apoio social e atividade sexual]; e (d) Meio ambiente [segurança e proteção física, ambiente doméstico, recursos financeiros, saúde e assistência social (disponibilidade e qualidade), oportunidades para adquirir novas informações e habilidades, participação e oportunidades de lazer / lazer, ambiente físico (poluição, ruído, clima, trânsito) e transporte]. A segunda escala, WHOQOL-Old (WHO, 2006), deve ser aplicada em conjunto com o WHOQOL-Bref. Este questionário é composto por 24 questões tipo likert que são agrupadas em seis domínios: (a) operação sensorial; (b) autonomia; (c) atividades passadas, presentes e futuro; (d) participação social; (e) morte e morte; e (f) intimidade. As pontuações desses seis domínios - ou os valores dos 24 itens do WHOQOL-Old - são combinados para produzir uma pontuação global da qualidade de vida para idosos, denotado nesta tese como o domínio do envelhecimento. Portanto, a medida de qualidade de vida foi avaliada em cinco domínios (ou seja, quatro domínios relacionados com o WHOQOL-Bref e um domínio relacionado com o WHOQOL-Old) que marcou na faixa de 0 a 100.

Satisfação com a vida

A satisfação com a vida trata-se essencialmente de uma avaliação cognitiva do desenvolvimento pessoal, relacionada com objetivos e expectativas globais. Assim, a satisfação com a vida remete para uma avaliação da congruência entre as circunstâncias de vida reais e ideais, de acordo com critérios estabelecidos pelo próprio indivíduo (Diener, Emmons, Larsen, & Griffin, 1985; Diener, Suh, Lucas, & Smith, 1999; Judge, Boudreau, & Bretz, 1994; Pavot & Diener, 1993). Para grande parte dos autores, a satisfação com a vida constitui um dos indicadores de um funcionamento psicológico positivo. Atualmente ainda não há consenso acerca das medições do bem-estar subjetivo, tal qual das suas componentes (i.e. afetos, relações sociais, satisfação com a vida, saúde física, espiritualidade e significado/realização). Apesar disto, verificam-se recentes esforços para clarificar e sistematizar as componentes e suas ferramentas de medição, pelo que ainda é um movimento necessário (Lindert, Bain, Kubzansky, & Stein, 2015).

Esse constructo apresenta relações com conceitos tão importantes como a felicidade e a qualidade de vida, e tem sido alvo de investigações nas últimas décadas, a qual, para além de sublinhar a sua grande utilidade e significado, tem vindo a revelar uma consistente estabilidade da satisfação com a vida (Diener & Suh, 1997), após uma extensa revisão de estudos com amostras de milhares de participantes em dezenas de países ao longo de alguns anos, concluíram

que a satisfação com a vida "parece manter-se relativamente estável entre as diferentes coortes na maior parte das sociedades" (p.310)

O constructo satisfação com a vida poderia ser descrito e abordado através de uma diversidade de formas. Entretanto, optou-se por realizar a sua abordagem e medição através da Escala de Satisfação com Vida – SWLS (Diener et al., 1985) foi desenvolvida como uma medida do componente de julgamento do bem-estar subjetivo (SWB). A escala não avalia a satisfação com os domínios da vida, como a saúde ou as finanças, mas permite aos sujeitos integrar e controlar esses domínios da maneira que eles escolherem. A SWLS versão adaptada para português (Simões, 1992) foi utilizada e compreende 5 questões de auto relato do tipo Likert (sete pontos). Essa escala tenta medir a disposição do indivíduo para esperar resultados positivos de forma racional, ou seja, essa escala se traduz nas expectativas que os indivíduos têm sobre seu futuro.

Otimismo

O otimismo é visto como uma característica cognitiva (um objetivo, uma expectativa, uma crença ou uma atribuição causal) em relação ao futuro desejado e sentido como sucesso (Oliveira-Barros, 2004). O otimismo é "uma disposição ou atitude associada a uma expectativa sobre o futuro material ou social que o avaliador olha como socialmente desejável para o seu proveito ou prazer" (Tiger, 1979, p. 18). Entretanto, o otimismo não provém unicamente da inteligência ou da cognição, mas tem também uma grande componente emocional e motivacional (Carver & Scheier, 1990). Trata-se então de uma característica ou dimensão importante da personalidade e mais em concreto de um estilo cognitivo-afetivo sobre como o sujeito processa a informação quanto ao futuro (Oliveira-Barros, 2004).

Seligman (1990) sugeriu quatro aspectos que mostram como o otimismo beneficia a saúde das pessoas: 1. O otimismo pode afetar a sua saúde durante toda a sua vida, evitando o desamparo e, assim, mantendo as defesas imunológicas mais difíceis; 2. O otimismo deve produzir boas preocupações com a saúde em relação aos regimes de saúde e à procura de conselhos médicos; 3. O otimismo deve impor-se para preocupações com a saúde, o grande número de eventos de vida ruins encontrados; 4. As razões finais pelas quais os otimistas devem ter uma melhor saúde dizem respeito ao apoio social. A capacidade de sustentar amizades profundas e amor parece ser importante para a saúde física (p.179).

O otimismo foi selecionado porque é uma das variáveis do bem-estar mais pesquisadas (Oliveira-Barros, 2004). O otimismo foi avaliado pela Escala de Otimismo (Barros, 1998) que compreende 4 questões de auto relato do tipo Likert (cinco pontos). Esta escala tenta medir a

disposição do indivíduo para esperar resultados positivos de forma racional, ou seja, essa escala se traduz nas expectativas que os idosos têm sobre seu futuro.

1.2 Objetivos e estrutura da tese

De acordo com o assunto principal sobre a qualidade do sono no envelhecimento numa perspectiva de saúde, define-se como objetivo geral desta tese explorar a qualidade do sono em pessoas idosas de forma a verificar as suas implicações na qualidade de vida. Também nos é importante tentar descrever como que esta temática pode permear a prevenção da depressão em idosos.

A estrutura desta tese está organizada a partir do objetivo geral, em que é subdividido em objetivos específicos que são abordados dentro de cinco estudos organizados em capítulos subsequentes. Desta maneira, os temas e seus objetivos específicos de cada capítulo serão, nomeadamente: *Estudos teóricos*, Estudo 1 – "Perspectives from Positive Psychology in Older Adults: Brief literature review". Apresentou o objetivo de verificar os principais achados sobre a Psicologia positiva em adultos mais velhos; Estudo 2 – "Depression and sleep quality in older adults: a meta-analysis". Apresentou o objetivo de avaliar os estudos sobre a qualidade subjetiva do sono, a fim de compreender como é que esta construção se refere à depressão em idosos. *Estudos empíricos,* Estudo 3 – "Adaptation of a 3-factor model for the Pittsburgh Sleep Quality Index in Portuguese older adults". Apresentou como objetivo verificar a estrutura fatorial do Índice de Qualidade do Sono de Pittsburgh (PSQI) numa amostra de idosos portugueses utilizando a abordagem de validação cruzada; Estudo 4 – "Depression and Quality of Life in Portuguese Older Adults: effect of sleep quality mediation". Apresentou o objetivo de avaliar hipóteses de mediação na tentativa de explicar como a depressão influencia a qualidade de vida considerando os efeitos da qualidade do sono para adultos idosos portugueses; Estudo 5 – "Sleep quality, quality of life and satisfaction with life in Portuguese older adults: effect of optimism medication". Apresentou o objetivo de avaliar hipóteses de mediação na tentativa de explicar o modo como a qualidade do sono influencia a qualidade de vida e a satisfação com a vida considerando os efeitos do otimismo para adultos idosos portugueses.

Na sessão final da tese, com o objetivo de interligar os contributos de cada estudo são apresentadas conclusões., as quais demonstraram as implicações da qualidade do sono na qualidade vida de pessoas idosas e de que maneira a depressão pode ser prevenida tendo em conta o contexto estudado. Com esta tese esperamos contribuir para o planeamento e aplicação de investigações que invistam numa intervenção eficaz, viável e de baixo custo, para a promoção da higiene do sono e da boa qualidade do sono. Ao mesmo tempo, promovendo a

qualidade e a satisfação com a vida e prevenindo a depressão. Portanto, esperamos que os resultados aqui demonstrados possam ser impactantes para na sociedade ao nível da qualidade de vida e da saúde mental.

2. ESTUDOS: Artigos publicados e Manuscritos

2.1 Estudo 1: “Depression and sleep quality in older adults: a meta-analysis”

Becker, N. B., Jesus, S. N., João, K. A. D. R., Viseu, J. N., & Martins, R. I. S. (in press). Depression and sleep quality in older adults: a meta-analysis. *Psychology, Health & Medicine*. Doi: 10.1080/13548506.2016.1274042

Abstract

The literature emphasizes depression and poor sleep quality as problems that affect many elderly individuals. However, these problems have been related in few studies and there is no meta-analysis performed so far on this relationship. The present research reviewed the studies performed on the subjective sleep quality in order to understand how it relates to depression in older adults. The review was conducted in January 2016 and comprised publications between 2005-2015. Based on the electronic databases Web of Science and EBSCO, we used the keywords "sleep quality", "depression", and "older" to identify the empirical studies performed. After assessing the collected studies, we selected those that presented the elderly as participants, resulting in nine papers (N =3069). A random-effects method was used to evaluate the relationship between depression and sleep. We found that an older person's lack of good sleep quality is significantly related to depression. The main limitation of this study was the difficulty in collecting a greater number of studies. Future research should consider the importance of additional variables (e.g., moderators) in order to understand and investigate viable interventions for prevention and health promotion in the elderly.

Keywords: Ageing; Depression; Meta-analysis; Sleep quality

Sleep difficulties comprise daytime impairments and nighttime sleep, according to the Diagnostic and Statistical Manual of Mental Disorders-V (DSM-V) (American Psychiatric Association, 2013). These include fatigue and daytime sleepiness, common aspects among older adults. Furthermore, DSM-V (American Psychiatric Association, 2013) emphasizes that sleep disturbances cause clinical distress or behavior impairment in several important areas of functioning (e.g., social, occupational, and educational). The impact of sleep difficulties in one's life makes mental health evaluation an important strategy to assess sleep problems (Wu, Su, Fang, Yeh Chang, & Chang, 2012).

The Pittsburgh Sleep Quality Index (PSQI) is the most instrument to evaluate the sleep quality through seven dimensions (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989). The widespread use of this instrument has shown that subjective sleep disturbances increase the risk of depression both in younger and older individuals (Cho et al., 2009; Martin, Fiorentino, Jouldjian, Josephson, & Alessi, 2010; Park, Yoo, & Bae, 2013; Rashid & Tahir, 2015).

Given the importance of depression and subjective sleep quality for the health of elderly, it is relevant to conduct a synthesis on the empirical studies addressing this topic, particularly since there are no previous reviews or meta-analyses published on this relationship. Therefore, we assessed the studies that employed, in elderly' samples, the PSQI as an evaluation tool at the sleep quality and depression level.

Method

This meta-analysis, which analyzed the period between 2005-2015, was conducted in January 2016 using the electronic databases Web of Science (WoS) and EBSCO. The search was conducted using the following terms: "sleep quality", "depression", and "older". The search was divided into five stages (Figure 1): (a) 359 references were found using the above-mentioned keywords; (b) the record's duplicates were removed; (c) the relevance of the studies was based on the following criteria: (c1) studies published in peer-reviewed journals; and (c2) empirical studies. After this phase we registered a total of 97 studies; (d) considering the use of two sources, some studies did not contemplate the objective of this review and were excluded; and (e) in the last phase, we only considered studies that: (e1) have the presence of enough data to analyze "what has been studied" and "how it was studied"; (e2) were composed by samples of older adults; and in which (e3) depression and sleep quality were assessed with the Pearson correlation coefficient (r), resulting in nine articles. These studies were evaluated considering

the source, setting, number of participants, average age, instruments used, and Pearson correlation coefficient (r). The Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) was followed in the selection and classification of the studies (Liberati et al., 2009).

Only nine studies have been used in this meta-analytical procedure. Davey and colleagues (2011) consider the use of this procedure to be valid for the analysis of two or more studies. This assumption was corroborated by Botella and Gambara (2006). Past meta-analyses have used a minimum of two studies (e.g., Jesus & Rus, 2011, 2013). The assessment process was performed by two independent reviewers. In situations of incompatibility, a third reviewer served as a jury. For the quantitative synthesis we used the Pearson Correlation Coefficient (r) as a standardized effect size measure that allows comparisons between the results from different studies, following the formulas of Hunter and Schmidt (2004), and Morris and DeShon (2002). In the studies that did not present the value of magnitude effects we calculated it through the averages presented (using a weighted average).

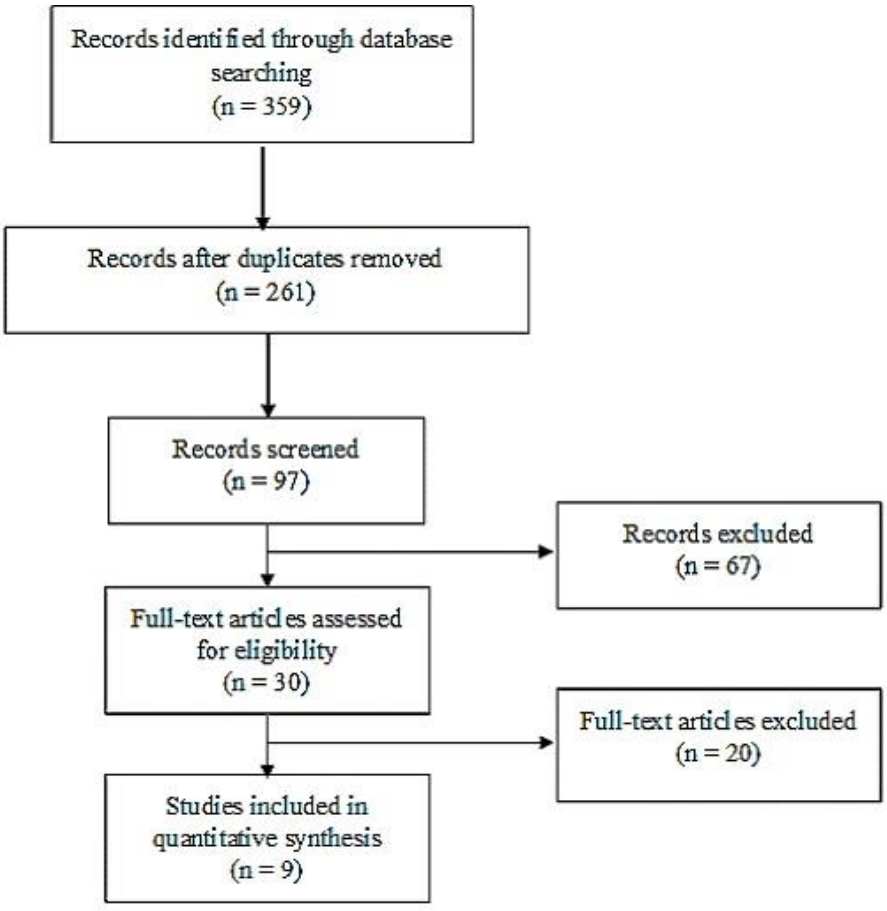

Figure 1. Phases of the collection of studies. The number (*n*) of studies that remained in the sample is presented in each phase

Based on the random effects model, we assumed that the magnitude effects varied (Hunter & Schmidt, 2004; Kisamore & Brannick, 2007). The correlation (r0) of the weighted averages was calculated. The weighting criterion was the sample size (Brannick, Yang, & Cafri, 2011). This procedure places greater weight on correlations that are less susceptible to sampling error (Hunter & Schmidt, 2004). Subsequently, the estimated confidence interval for each mean correlation was calculated. A 95% confidence interval was used to evaluate the accuracy of magnitude effect estimates. The variance values using this meta-analytic technique provide an indication of the degree to which the variability in all studies may be due to factors other than sampling errors. A value below 75% of the observed variation indicates the existence of moderation. The homogeneity of magnitude effects was assessed by the χ^2 test (Ellis, 2010), a significant probability indicates the presence of moderation.

Data were analyzed with the Comprehensive Meta-Analysis software version 2.2 (Villar, Mackey, Carroli, & Donner, 2001).

Results

The characteristics of the studies were discriminated (Figure 2) to establish a thorough summary of each research.

Source	Setting	*N*	Average age	Instruments		*r*
				Depression	Sleep Quality	
Valentine et al. (2011)	CD	182	69.2	GDS	PSQI	0.306***
Martin et al. (2010)	CP	121	85.3	GDS	PSQI	0.268**
McHugh et al. (2011)	CP	636	72.0	CES-D	PSQI	0.415***
Park et al. (2013)	CP	157	74.0	GDS	PSQI	0.54***
Shin et al. (2010)	CD	213	73.3	GDS	PSQI	0.43***
Chang et al. (2014)	CP	2040	75.6	GDS	PSQI	0.37***
Yang et al. (2015)	CP	87	65.2	HADS-D	PSQI	0.54**
		87	65.2	HADS-D	PSQI	0.74**
Orhan et al. (2012)	CP	73	74.0	GDS	ESS	0.091
					PSQI	0.231*
Wu et al. (2012)	CD	100	74.7	TDQ	PSQI	0.517***
Total		3609	73.0			

Figure 2. Summary of the characteristics of the studies included in the meta-analysis (*n* = 9). N = Sample; ***p<0.001; **p<0.01; *p<0.05; CD = Community-dwelling; CP = Clinical population; GDS = Geriatric Depression Scale; CES-D = Center for Epidemiological Studies Depression scale; HADS-D = Hospital Anxiety and Depression scale; TDQ = Taiwanese Depression Questionnaire; PSQI = Pittsburgh Sleep Quality Index; *r* = Pearson Correlation Coefficient.

Figure 3 summarizes the results of the meta-analysis.

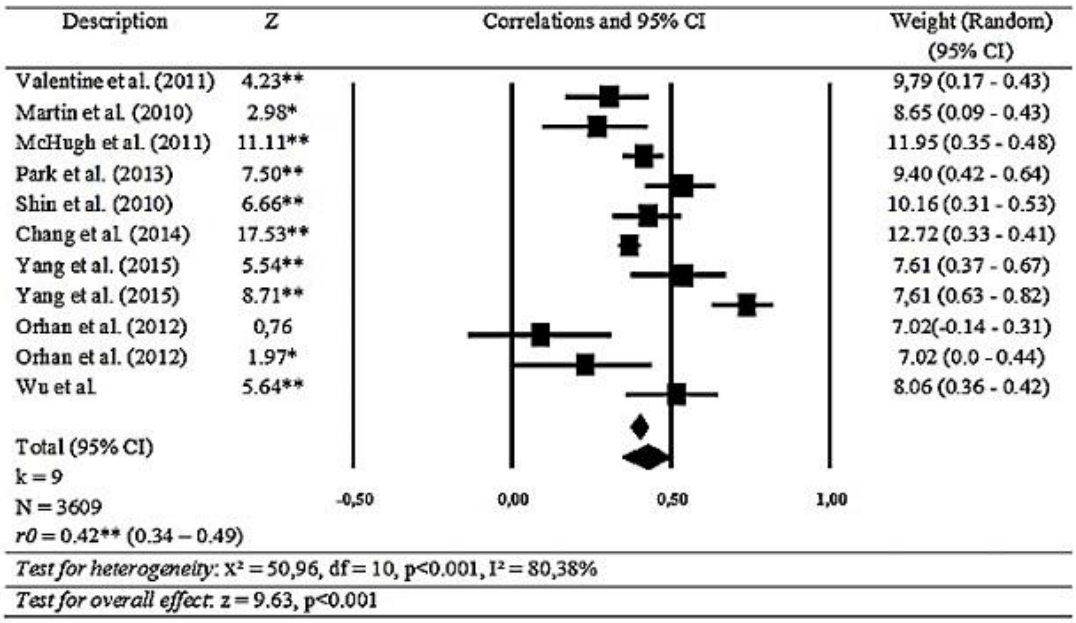

Figure 3. Summary of the results between sleep quality and depression in older adults. $^{**}p < 0.001$; $^{*}p < 0.05$; *k* = number of independent samples; *N* = number of participants; *r*0 = weighted mean of the observed effect size; χ^2 = chi-squared test; *df* = freedom degrees; *p* = probability of Chi-squared test; I^2 = explained variance of the effect size observed; *Z* = standardized overall effect (random model).

Our results indicated the existence of sample heterogeneity ($\chi^2 = 50.96$, df = 10, $p < 0.001$, $I^2 = 80.38\%$) and showed that moderators influence the relationship between sleep quality and depression. As shown in Figure 3, the percentage of explained variance (I^2) is more than 75% and the probability of the Chi-squared test is significant ($p < 0.01$). The correlation magnitude is moderate (r0 = 0.42) and significant, which is reflected by the 95%CI [0.34; 0.49] that does not include the value 0, suggesting a positive relationship.

Discussion

We found six sources that included individuals with some limiting condition, assisted in clinics or at home. Only three sources complied with general community settings. This means that the individuals who participated in these studies were considered able to live independently and without significant limitations. Although most participants were community-dwelling it is not possible to consider that they were not affected by pathologies associated with depression or that they did not have any mental/social difficulties (Aziz & Steffens, 2013). Nevertheless, we chose to understand that these participants were healthier than those included in clinical samples. This is in line with the assertions of Buysse (2014), shifting the focus from sickness

to health is a promising prospect for research, namely for the investment in health promotion and public education initiatives.

In this meta-analysis depression was associated with subjective sleep disturbances, aspect corroborated by past studies (e.g., Dzierzewski et al., 2015; Maglione, Ancoli-Israel, et al., 2012; Orhan et al., 2012; Park et al., 2013; Potvin, Lorrain, Belleville, Grenier, & Préville, 2014; Rashid & Tahir, 2015). Given the role of depression on the subjective sleep quality, depression treatment should focus on both mental health and sleep quality (Buysse, 2004; Yao, Yu, Cheng, & Chen, 2008). Sleep quality was associated with depression with a negative impact on health. However, as stated by Buysse (2014), sleep health has become an important tool to understand potential innovations in health interventions. Future researches should involve new partnerships between the health care delivery systems, public health and social services sectors, as well as new methods to assess the sleep health status in the community and to provide targets for intervention.

The development of strategies to improve the sleep quality and life in the elderly emphasizes the continued importance of mental health evaluation (Wu et al., 2012). Recently, sleep hygiene education has revealed itself as an intervention strategy with the potential to cover the growing public health concerns regarding the increase of sleep complaints in the general population (Irish, Kline, Gunn, Buysse, & Hall, 2015). However, there is still a shortage of replications about the use and relevance of sleep hygiene components (Irish et al., 2015).

The limitation of this study was the difficulty to collect due to the restrictions imposed by the inclusion criteria, e.g., the studies were limited to elderly population. It is important to conduct a meta-analysis encompassing all ages with the objective of applying a meta-regression on the relationship between sleep quality and depression.

In conclusion, there was a relationship between depression and sleep quality indicating the importance of paying close attention to the sleep quality of older people with depressive symptoms. An older person's lack of good sleep quality is probably associated with depressive symptoms.

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2.2 Estudo 2: "**Perspectives from Positive Psychology in Older Adults: Brief literature review"**

Becker, N. B., João, K. A. D. R., Jesus, S. N., Bonança, J., & Martins, R. (2016) Perspectives from Positive Psychology in Older Adults: Brief literature review. *Journal of Spatial and Organizational Dynamics*, 4(1), 21-29.

Abstract

The present review aims to determine the main findings concerning positive psychology in older adults. We used the electronic databases Web of Science and EBSCO, which were efficient tools to find the necessary heterogeneity for the selection of studies published between 2005 and 2015, through the following keywords: “Positive Psychology” and “Older”. After selecting 12 studies, they were assessed regarding the following information: (a) source; (b) setting; (c) number of older adults (participants); (d) average age (SD); (e)inclusion criteria for each study; (f) instruments; and (g) the results of our investigative question. The results show that interventions with a positive psychology approach are favorable to the reduction of symptoms (anxiety and depression) and the increase of well-being; and positive psychology constructs have the same impact on well-being and on reducing symptoms, portraying a promising approach to public health. Our investigation showed the necessity to develop a new perspective on aging. Some of the assessed studies reported that it is possible to achieve this with the inclusion of positive psychology, which can facilitate this development.

Keywords: Older Adults, Elderly, Positive Psychology, Review.

The world's population is aging and the World Health Organization (World Health Organization, 2015) reported that, in the next decades, namely by 2050, the world's population aged over 60 years will have increased from the current 841 million to 2 billion, making the well-being of seniors a new challenge in global public health. In 2020, for the first time in history, the number of people over 60 years old will be higher than that of children up to 5 years old (World Health Organization, 2015). Unfortunately, the increasing number of elderly people has not been accompanied by an increase in public services ready to take care of them (World Health Organization, 2015). A contradiction is apparent in this situation, because higher life expectancy is not directly related to healthy living, since many elderly people are living longer but without quality of life, currently depending on drugs or being kept in specialized institutions. This scenario indicates a public health problem that needs to be solved. The latest world report on ageing and health highlighted the need for a new global framework to cover the wide diversity of older populations and address the inequalities beneath it (World Health Organization, 2015). From a global perspective, the described needs focus on the development of new health care systems in the long term; a change in the way of understanding aging; encouraging the development of new processing approaches; and strengthening the capacity to assist older people in adapting to the changing environment (World Health Organization, 2015).

We suggest that the need to change the understanding of aging might be addressed with positive psychology. The focus is currently still on the disease model (World Health Organization, 2015), of which the main feature is the repair operation of human injury (Seligman & Csikszentmihalyi, 2000), an approach that has not been adequate (World Health Organization, 2015). In addition, positive psychology produced the goal of "catalyzing a change in the focus of psychology from preoccupation only with repairing the worst things in life to also building positive qualities" (Seligman & Csikszentmihalyi, 2000, p. 6). Thus, positive psychology has offered a new approach to mental health promotion (Kobau et al., 2011).

Investigations with seniors have used interventions of positive psychology methods with positive effects on well-being and on reducing anxiety and depression (Ho et al., 2014; Proyer et al., 2014; Ramírez et al., 2014). Increasing the scientific redirection of negative affect (Seligman & Csikszentmihalyi, 2000) in future research may be essential to promoting well-being and long-term quality of life for elderly people. With this in mind, it becomes important to check the main studies that use the measurement of at least one of the constructs of positive psychology. No recent literature review dealing with a specific examination of the variables of positive psychology (measurable) in the elderly was found.

This brief literature review aims to determine the main findings in terms of positive psychology in the elderly, focusing on the prospects for future research. In this way we will try to clarify what has been found in the past decade in published empirical studies, so that, in accordance with the guidelines presented by the World Health Organization (2015), subsequent research can contribute efficiently to the development of strategies and effective public policies with regard to aging.

Method

The present review reports an investigation of positive psychology aspects in older adults undertaken during the month of November 2015. We used the electronic databases Web of Science and EBSCO, which were efficient tools in finding the necessary heterogeneity for the selection of studies published between 2005 and 2015 through the keywords "positive psychology" and "older," covering the largest possible amount of studies (n = 211). The next step consisted of removing the duplicated findings (n = 156) and considering some eligibility criteria: the samples should a) consist exclusively of older people or they should be clearly differentiated from the overall sample; b) be empirical studies; c) measure a certain range or actual effectiveness of any program related to positive psychology; d) provide sufficient results for the discussion of the measurement of a particular variable of positive psychology; and e) be written in the English or Portuguese language. Then, the articles assessed as eligible (n = 15) were evaluated. A further 3 studies were excluded given that they did not show the statistical information necessary to understand the results and did not present cohesive conclusions about a construct of positive psychology in older people.

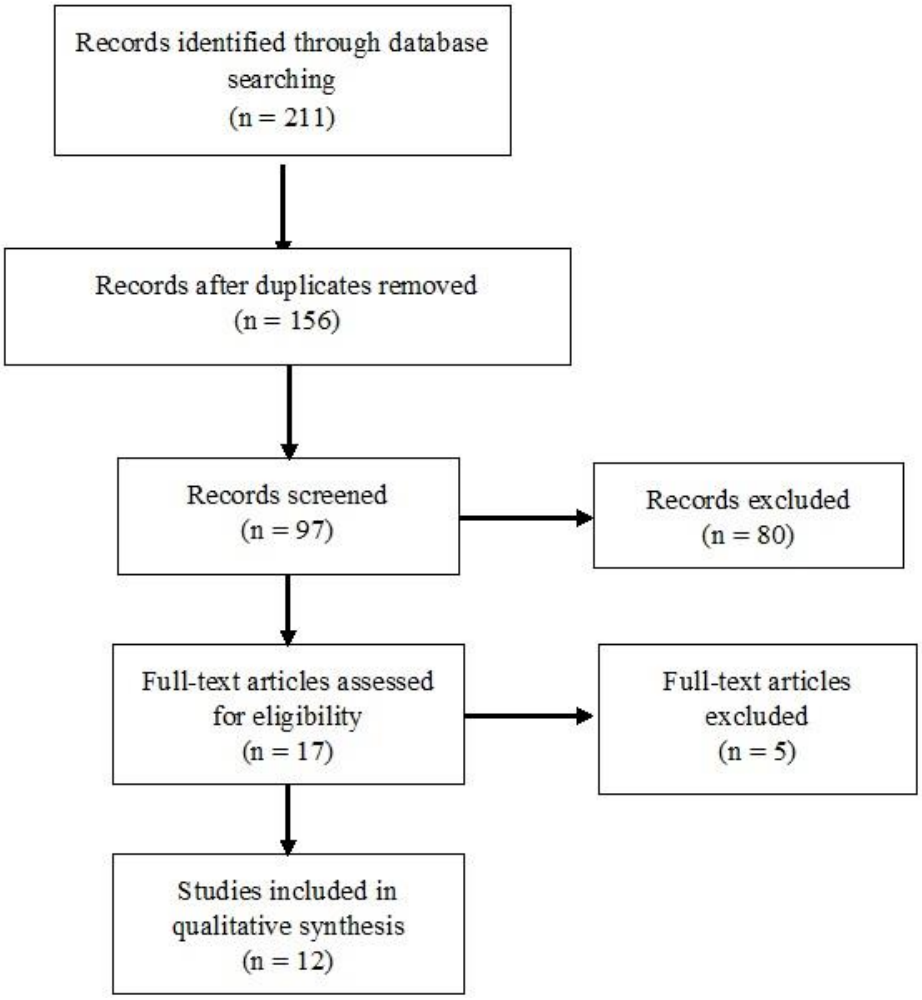

*Figure 1***.** Phases of the review. The number (n) of studies that remained in the sample was present in each phase.

After the selection of 12 studies, they were assessed regarding the following information: (a) source; (b) setting; (c) number of older adults (participants); (d) average age (SD); (e) inclusion criteria for each study; (f) instruments; and (g) the results of our investigative question. The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) was applied to the method of selection and classification of the studies under review (Liberati et al., 2009).

Results

The characterization of "positive psychology" followed the same approach. All the investigations measured at least one scale of a construct of positive psychology, but some interventions were carried out using the approach of positive psychology with regard to the use

of the variables that comprise it (Ho et al., 2014; Proyer et al., 2014; Ramírez et al., 2014). The theoretical perspective was confirmed by the selection of studies with identical subjects (i.e. older adults). Some studies used the general population for comparative purposes (Işık & Üzbe, 2015; Ruch, Proyer, & Weber, 2010; Westerhof & Keyes, 2010); however, we considered only those that differentiated the elderly population in the analysis of the results.

In these investigations, the constructs of "positive psychology" measured through self-report questionnaires were: a) life satisfaction; b) happiness; c) well-being; d) gratitude; e) meaning in life; f) positive emotions; and g) quality of life. The methodological approach was not common to all the studies: some were studies on methods of intervention and quantitative studies, though all were considered to be empirical studies.

Table 1 displays the source, setting, number of older adults overall and per genre, average age, standard derivation, and inclusion criteria for the sample in each investigation. The total number of participants was 4823 (2580 females and 2243 males). This figure does not take into consideration 2 samples for which their papers did not present the exact values of the group of older adults (Işık & Üzbe, 2015; Westerhof & Keyes, 2010). The average age was 73.29 years, calculated from the average values given in the papers comprising only older adults as participants. In the selected investigations, different ages were considered for older adults: a) people over 50 years old (Proyer et al., 2014; Yamada, Merz, & Kisvetrova, 2014); b) people over 55 years old (Smith & Hollinger-Smith, 2015); c) people over 60 years old (Gana, Bailly, Saada, Joulain, & Alaphilippe, 2013; Ho et al., 2014; Ramírez et al., 2014); and d) people over 65 years old (Homan, 2014; Işık & Üzbe, 2015; Koopmans, Geleijnse, Zitman, & Giltay, 2010; Ruch et al., 2010; Westerhof & Keyes, 2010; Wolverson, Clarke, & Moniz-Cook, 2010).

Regarding the setting (Table 1), the majority (n = 9) of the papers considered persons of the general community, namely people who were without cognitive deterioration, non-institutionalized, and not undergoing current psychotherapeutic or psychopharmacological treatment, meaning that most of the participants in these investigations were possibly not sick. On the other hand, three studies were performed with older adults who were using permanent medical services, that is, residents of nursing homes, people diagnosed with dementia, or home care clients.

Table 1

Articles Included in the Literature Review, Participant Characterization, Setting, and Inclusion Criteria (N = 12)

Source	Setting	Number of older adults (F/M)	Average age (SD)	Inclusion criteria
Ramínez et al. (2014)	DC[1]	46 (29/17)	71.18 (7.06)	Did not demonstrate cognitive deterioration, aged 60 or older, and gave their informed consent.
Koopmans et al. (2010)	NI[2]	861 (451/410)	75.00 (5.70)	Non-institutionalized elderly men and women aged 65, who agreed to be interviewed at baseline (informed consent)
Ruch et al. (2010)	CD[3]	1792 (919/873)	37.83 (12.80)	German-speaking, completed the questionnaires online
Homan (2014)	CP[4]	106 (73/33)	75.30 (7.0)	People from three community programs aimed at older adults who gave informed consent
Yamada et al. (2014)	HC[5]	361 (239/122)	77.30 (n.i.)	Aged 50 years old and lacking cognitive impairments
Westerhof & Keyes (2010)	NI[2]	1340 (670/670)*	48.32 (17.66)	Dutch-speaking non-institutionalized individuals, households in the Netherlands
Proyer et al. (2014)	OR[6]	510 (163/347)	55.58 (5.16)	Adults over 50 years old, completed baseline questionnaires online, currently not in psychotherapeutic or psychopharmacological treatment, and no current use of illegal drugs on a regular basis
Ho et al. (2014)	CC[7]; NH[8]	74 (66/8)	77.97 (7.03)	Adults over 60 years old, not clinically depressed, and with intact verbal and hearing abilities for interpersonal communication

Table 1

(Continue)

Source	Setting	Number of older adults (F/M)	Average age (SD)	Inclusion criteria
Gana et al. (2013)	NI[2]	899 (512/387)	72.73 (5.68)	Non-institutionalized age cohort of residents from the "Center of France" region
Smith & Hollinger-Smith (2015)	CC[7]	164 (121/43)	n.i.	Aged 55 or older, living in a large metropolitan area, and agreed to participate in the study
Wolverson et al. (2010)	MC[9]	10 (7/3)	81.10 (n.i.)	Diagnosis of dementia, within the mild level of severity of the MMSE[10], an awareness of memory difficulties and diagnosis, people over the age of 65, with sufficient verbal fluency and able to give informed consent
Işık & Üzbe (2015)	CD[3]	335 (190/145)*	n.i.	Adult population

* All participants (all ages)

DC[1] – day center (members); NI[2] – non-institutionalized; CD[3] – community dwelling; CP[4] – community programs aimed at older adults; HC[5] – home care clients; OR[6] – online registration; CC[7] – community centers; NH[8] – nursing homes; MC[9] – memory clinic; MMSE[10] – Mini Mental State Exam.

Table 2 presents the main results according to the purpose of this review and the instruments used to collect data from each study conducted from the perspective of positive psychology in older adults. The evaluation tools were separated into three categories: a) negative measures of states of humor and affection; b) measures of cognition and health status; and c) positive measures of states of humor and affection. Regarding the main results, a positive psychology approach decreased the state/symptoms of anxiety and depression, reducing the negative impact of comorbidity as well as increasing specific memory, life satisfaction, happiness, and gratitude. It was also demonstrated that constructs of positive psychology, such as life satisfaction, resilience, happiness, and the ability to enjoy positive experiences (i.e. psychological well-being), had an impact on reducing mortality and depression in older adults, even though they showed lower levels of subjective well-being than younger ones.

Table 2

Main Results of the Studies Conducted on Positive Psychology in Older People (N = 12)

Source	Instruments	Results
Ramínez et al. (2014)	STAI[1]; BDI[2]; AMT[3]; MEC[4]; LSS[5]; SHS[6]	Those participants who followed the program showed a significant decrease in states of anxiety and depression as well as an increase in specific memories, life satisfaction, and subjective happiness compared with the control group.
Koopmans et al. (2010)	SSWO[7]; PA[8]	Happiness predicted lower mortality, which may partly be mediated by more physical activity and lower morbidity.
Ruch et al. (2010)	VIA-IS[9]; SWLS[10]; OTH[11]	Humor presented a strong positive correlation with life satisfaction, as well as with a pleasurable and engaged life, but a weaker one with meaningful life. The oldest participants had the lowest correlation coefficients.
Homan (2014)	AGI[12]; ECR[13]; PWB[14]	Secure (non-anxious) attachment to God predicted positive relationships with others, self-acceptance, environmental mastery, and personal growth. Avoidant attachment did not predict any of the well-being indices.
Yamada et al. (2014)	CCI[15]; QOL[16]; AAQ[17]	The negative impact of comorbidity on the quality of life might be mitigated by promoting a positive self-perception of aging in older people.
Westerhof & Keyes (2010)	MHC-SF[18]; BSI[19]; PC[20]; ADL[21]; SH[22]	Older adults, except for the oldest, scored lower on psychopathological symptoms and were less likely to be mentally ill than younger adults. Although there were fewer age differences for mental health, older adults experienced higher levels of emotional well-being, similar levels of social well-being, and slightly lower levels of psychological well-being.

Table 2

(Continue)

Source	Instruments	Results
Proyer et al. (2014)	AHI[23]; CES-D[24]	Three out of the four interventions (i.e. gratitude visit, three good things, and using signature strengths in a new way) increased happiness, whereas two interventions (three funny things and using signature strengths in a new way) led to a reduction of depressive symptoms in one post-measure. Positive psychology interventions yielded similar results in people aged 50 and above and in younger people.
Ho et al. (2014)	GDS[25]; GQ[26]; LSL[5]; SHS[6]	The intervention reduced the number of depressive symptoms and increased the levels of satisfaction, gratitude, and happiness.
Gana et al. (2013)	SWLS[10]; SPH[27]	The findings from both unconditional and conditional models indicated a linear increase in LS for an eight-year period. As expected, the results showed significant random variation in both interception and slope, indicating that the participants started at different levels and changed at different rates.
Smith & Hollinger-Smith (2015)	SBI[28]; ROAS[29]; SL[30]; SHS[6]; CES-D[24]	In older adults greater resilience and greater ability to savor positive experiences both predicted greater happiness, lower depression levels, and greater life satisfaction (i.e., greater psychological well-being). However, the relationship between savoring experiences and psychological well-being was stronger in people with lower resilience.
Wolverson et al. (2010)	MMSE[31]; GRAD[32]; CSDD[33]; SEIS[34]	Eight themes were extracted and subsumed under two higher-order themes: "live in hope or die in despair" and "keep living and keep living well." The participants described how their internalized hope-fostering beliefs, which were often learned during childhood, were challenged by the reality of hope-hindering experiences associated with (cont.)

Table 2

(Continue)

Source	Instruments	Results
		old age and dementia. A balancing process of reappraisal enhanced resolution and the sense of stability and then allowed them to develop positive attitudes towards common age-related health constraints and social circumstances.
Işık & Üzbe (2015)	MLQ[35]; PANAS[36]; ABPT[37]	Young adults' search for meaning in life was higher than that of either middle-aged adults or older adults. Positive affect, extroversion, openness to experiences, agreeableness, and conscientiousness correlated with both the presence of meaning in life and the subject's search for meaning in life.

STAI[1] – State and Trait Anxiety Inventory; BDI[2] – Beck Depression Inventory; AMT[3] – Autobiographical Memory Test; MEC[4] – Mini-Cognitive Exam; LSS[5] – Life Satisfaction Scale; SHS[6] – Subjective Happiness Scale; SSWO[7] – Scale of Subjective Well-being for Older Persons; PA[8] – physical activity; VIA-IS[9] – Values in Action Inventory of Strengths (humor scale); SWLS[10] – Satisfaction with Life Scale; OTH[11] – Orientations to Happiness Scale; AGI[12] – Attachment to God Inventory; ECR[13] – Experiences in Close Relationships Scale; PWB[14] – psychological well-being; CCI[15] – Charlson Comorbidity Index; QOL[16] – Quality of Life *[Continue]*

[Continue] (World Health Organization), Whoqol-Bref and Whoqol-Old; AAQ[17] – Attitudes to Aging Questionnaire; MHC-SF[18] – Mental Health Conditions; BSI[19] – Brief Symptom Inventory; PC[20] – physical conditions; ADL[21] – activities of daily living; SH[22] – subjective health; AHI[23] – Authentic Happiness Inventory; CES-D[24] – Center of Epidemiologic Studies Depression Scale; GDS[25] – Geriatric Depression Scale; GQ[26] – Gratitude Questionnaire; SPH[27] – self-perceived health; SBI[28] – Savoring Beliefs Inventory; ROAS[29] – Resilience in Older Adults Survey; SL[30] – satisfaction with life; MMSE[31] – Mini Mental State Exam; GRAD[32] – Guidelines for Rating Awareness in Dementia; CSDD[33] – Cornell Scale for Depression in Dementia; SEIS[34] – Semi-structured Interview Schedule; MLQ[35] – Meaning in Life Questionnaire; PANAS[36] – Positive and Negative Schedule; ABPT[37] – Adjective-Based Personality Scale.

Discussion

This brief literature review intended to perform a survey of the empirical studies conducted in the last decade on positive psychology in the elderly, taking into consideration the results found. It also aimed to report the perspectives that are still essential in this field of research, hence enabling a dialogue with the guidelines presented by the World Health Organization (2015) and making it possible to explore perspectives for future research in this area of investigation. The age defined by each paper for older adults presented variations starting at 50 years old, showing a lack of consensus (Proyer et al., 2014; Yamada et al., 2014). However, around the age of 60, when major disabilities and losses are more obvious (World Health Organization, 2015), one can be considered an older adult. This difference is evident according to countries' income, since, on average, the health conditions of older people are

worse in countries where the income is low than in higher-income countries, as well as the life expectancy, considering the lower average of older people (World Health Organization, 2015). However, regardless of the country in which the investigations were conducted, a standard age could be established to consider aging and therefore enable greater generalization power and comparability of the results presented worldwide.

We understand that the age considered is important for us to know a person's point in life, their capabilities and limitations, and whether they can expect a healthy or ailing old age. This subject is associated with healthy aging considering the process of developing and maintaining the functional ability that enables well-being in old age (World Health Organization, 2015). Thus, well-being along with quality of life are the main goals of mental health promotion as understood by the approach of "positive psychology" that is at issue in this review (Kobau et al., 2011).

The contents of the analyzed studies were presented as the ability to understand and intervene, taking into consideration positive attributes, psychological assets, and strengths, through positive emotions, positive individual traits, positive relationships among groups, and enabling institutions that foster positive outcomes (Kobau et al., 2011). The majority of them (n = 9) were performed with people who were considered to be healthy, an important indicator that research has been seeking possible contributions from non-clinical specimens or samples without limiting diseases. In view of what Buysse (2014) reported on the need for special care to look more at good health, perhaps science can move forward and contribute to people's health.

The need to change focus has also been reported more recently by the World Health Organization (2015) as being essential for a new way of understanding aging. Therefore, when we consider the results of these investigations, we notice that a positive psychology approach shows favorable results in reducing symptoms (anxiety and depression) and increasing well-being; positive psychology constructs have the same impact on well-being and on the reduction of symptoms, portraying a promising approach to public health (Kobau et al., 2011).

It is important to consider that there are limitations in this research with regard to the non-tireless conducting of empirical studies on the subject, and we cannot determine the generalizability of the presented results with complete accuracy. It is also important to note that, regardless of the inability to reach the maximum total number of studies, it was possible to access recent information sources, including articles published in recent years. The studies contained in this brief literature review can be used as a source capable of dealing with the most recent guidelines for thematic research on the elderly.

Finally, our study showed the necessity to develop a new perspective on aging. Some studies reported that it is possible to achieve this, and the inclusion of positive psychology can make the task easier. The best way to give our older people better life quality is through positive actions, which will demonstrate a better view of life.

Acknowledgments

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2.3 Estudo 3: Adaptation of a 3-factor model for the Pittsburgh Sleep Quality Index in Portuguese older adults

Becker, N.B., & Jesus, S. N. Adaptation of a 3-factor model for the Pittsburgh Sleep Quality Index in Portuguese older adults. (submitted) *Psychiatry Research*. Doi: 10.1016/j.psychres.2017.02.033

Abstract

The present study examined the factor structure of the Pittsburgh Sleep Quality Index (PSQI) in a sample of older Portuguese adults using a cross-validation approach. Design is a cross-sectional. A convenience sample of 204 community-dwelling older adults (M=70.05, SD=7.15) were included. The global sleep quality (GSQ) score ranged from 0 to 18 with a mean of 5.98 (SD ± 3.45). The distribution showed that gender and perception of oneself as healthy influences GSQ in this sample. Cronbach's α was 0.69, but increased to 0.70 if the "use of sleep medication" component was deleted. Exploratory factor analysis (EFA) demonstrated two factor model is better than one factor, and a model fit with good indices (chi-square=8.649, df=8, p=0.373). Confirmatory factor analysis (CFA) was performed on the single factor, two factor, and three factor models, with and without the "use of sleep medications" component. The best model was the 3-factor model without the "use of sleep medications" component (chi-square=1.214, df=6, GFI=0.997, AGFI=0.918, CFI=0.986, RMSEA=0.046). The adaptation of the model is similar to the original model, with the only change being the exclusion of the "use of medications to sleep" component. We suggest using that component as a complementary qualitative assessment of health.

Keywords: PSQI; Older adults; Portugal; 3-factor model

Currently, sleep problems constitute a global epidemic that threatens the health and quality of life of approximately 45% of the world's population (Wade, Zisapel, & Lemoine, 2008; WASM, 2016). Sleep deprivation and poor sleep quality have a high negative impact on health in the short and long term. Poor sleep quality has a negative impact on attention, memory and learning (WASM, 2016). It has also been associated with several serious health problems such as obesity, diabetes, and some cancers (Gottlieb et al., 2005; Gümüştekín et al., 2004; Taheri, Lin, Austin, Young, & Mignot, 2004; WASM, 2016). In addition, many psychological disorders such as depression, anxiety and psychosis are also associated with sleep difficulties (Beusterien et al., 1999; WASM, 2016; Zammit, Weiner, Damato, Sillup, & McMillan, 1999).

Although the majority of sleep disorders are easily prevented or treated, fewer than one-third of those affected seeks professional assistance (WASM, 2016). However, sleep is a basic need of all people, just like eating and drinking, being crucial to ensure good health and quality of life (WASM, 2016). In a comprehensive epidemiological studies, it was found that more than 50% of older adults have insomnia complaints (Foley et al., 1995; Neikrug & Ancoli-Israel, 2010), and sleep improvement was associated with health improvement (Foley, Monjan, Simonsick, Wallace, & Blazer, 1999; Neikrug & Ancoli-Israel, 2010). However, other studies have also shown that the rates of sleep disorders are lower in healthy older adults (Neikrug & Ancoli-Israel, 2010; Vitiello et al., 2002). So, what changes over the lifespan is not an intrinsic ability to sleep well, but comorbidities related to aging, and not necessarily caused by aging itself (Neikrug and Ancoli-Israel, 2010).

Thus, the ability to identify any difficulties in sleep as soon as possible is essential for the screening of other important comorbidities to act in maintaining good quality of life and well-being of older people. The sleep assessment instrument most commonly used in clinical and research environments is the Pittsburg Sleep Quality Index – PSQI (Mollayeva et al., 2016). It is a self-assessment questionnaire with 19 items that measures sleep disorders through seven components that together make up a Sleep Quality score (Buysse et al., 1989). Several studies have examined the one-dimensionality of the PSQI and raised concerns about the factorial structure of the instrument (Mollayeva et al., 2016). Through a systematic review and meta-analysis it was found that eight out of eleven studies that factor analyzed the PSQI reported that a single factor model poorly fit the resulting data, and the PSQI is best represented by a model with two or three factors (Mollayeva et al., 2016).

Relatedly, analysis of the instrument using a Portuguese sample (João et al., 2017) found poor reliability (Cronbach's alpha). As demonstrated by Mollayeva et al. (2016), most studies

using factor analysis achieved better results with a model with two or three factors. We understand that it is necessary to adapt a three factor model for the PSQI as, previously, reported by Cole et al. (2006), which will give an upgrade in our sample.

Methods

Pitsburgh Sleep Quality Index

The PSQI assesses sleep quality over a one-month period. The questionnaire consists of 19 self-rated questions and five (5) questions that are to be answered by bedmates or roommates. These last five questions are used only for clinical information and, therefore, they are not tabulated in the scoring or reported in this article. The 19 self-rated questions are grouped into seven (7) components, with each one scored on a scale that ranges from 0 to 3 (see more detail in the original study, Buysse et al., 1989). The PSQI components are the following: 1) subjective sleep quality, 2) sleep latency, 3) sleep duration, 4) habitual sleep efficiency, 5) sleep disturbances, 6) use of sleeping medication, and 7) daytime dysfunction. The sum of these components yields one global score, which ranges from 0 to 21, where the highest score indicates the worst sleep quality. A global PSQI score greater than 5 indicates major difficulties in at least two (2) components or moderate difficulties in more than three (3) components (Buysse et al., 1989). The Portuguese version of the PSQI (João et al., 2017) was used in this study to evaluate its psychometric properties and the degree of fit of the three factor model in Portuguese older adults.

Sample

This study used a cross-sectional design. A convenience sample of 204 community-dwelling (152 females and 52 males) older adults (aged M=70.05, SD=7.15) were included. They were recruited in senior universities in Portugal. The inclusion criteria were: (a) more than 60 years old; (b) ability to understand, read and write in Portuguese; (c) does not live in nursing home; and, (d) does not require permanent medical care in a specific location. Those who lacked mental clarity about the scales or could not read the questions were excluded. All people who participated in this research gave their informed consent to answer the questionnaire.

Statistical analysis

A total of 204 questionnaires were completed and checked for data entry errors, missing data, or the presence of major outliers. Data analyses were performed with SPSS software version 21 and AMOS version-29. Given the nature of the variant and nonlinear transformations from item responses into component scores, statistical analysis was conducted on the component scores. The PSQI item responses were combined into seven different components

(Buysse et al., 1989), which had small amounts of missing data, with no more than 5% missing data for any composite. A single-point multiple imputation
procedure for missing data replacement (Schafer & Graham, 2002) was conducted for the missing points.

Descriptive statistics were computed for each sociodemographic and PSQI (global and components scores) variable, and their psychometric proprieties were examined (i.e., Cronbach's Alpha [α] was computed). Descriptive statistics were calculated as frequencies (%) for categorical variables, whereas means and standard deviations were
computed for continuous variables. KMO and Bartlett tests were performed to determine the suitability of this sample for factor analysis. Subsequently, the sample was split randomly into two independent groups to perform EFA (exploratory factor analysis) and
CFA (confirmatory factor analysis) through software command (SPSS 21).

EFA was performed on the first random sample (n=102) using maximum likelihood estimate extraction and direct oblimin rotation to examine the factor structure of the PSQI-PT in older adults. CFA was conducted using the AMOS-21 (AMOS development Corporation, Spring House, PA, USA) in the second random sample (n=102). In this analysis we tested the model identified through the EFA, the single factor structure of the PSQI, and the three factor model suggested by Cole et al. (2006). The adjustment of the model was assessed using several statistical indices including a chi-square test (non-significant values indicate good model fit), the root mean square error of
approximation (RMSEA; values ≤0.08 indicate close approximate fit), and the comparative fit (CFI), goodness of fit (GFI), and adjusted goodness of fit (AGFI) indices (values > 0.97 indicate good model of fit) (Hair Jr., Black, Babin, & Anderson, 2010).

Ethical aspects

This research was performed in accordance with European research guidelines. All participants in this research freely consented to answer the questionnaire and signed an informed consent form before inclusion in the study.

Results

The PSQI-PT global score ranged from 0 to 18 with a mean of 5.98 (SD ± 3.45). The sociodemographic characteristics are in Table 1. The distribution of the global sleep quality (GSQ) scores is the same for the categories of sociodemographic variables (Table 1), except

for gender and self-assessed healthiness (“Do you consider yourself a healthy person?”). The regression analysis showed that gender (β=0.195, t=2.72, p=0.004) and self-assessed healthiness (β=0.257, t=3.85, p <0.001) significantly predict together a GSQ (r2 =0.108, F =12.07, p <0.001). Specifically, males (M =4.76) had significantly better average sleep quality than females (M =6.39), and individuals who said they considered themselves healthy had significantly better sleep quality than those who did not.

Table 1.

Demographic and sociodemographic characteristics and global sleep quality distribution.

	N	%	Mean	SD	GSQ (M ±SD)	r[a]	Distribution GSQ (P-value)
Age (years)			70.05	7.15	5.98 ±3.45	-0.06	-
Sex						0.20*	
Female	152	74.90			6.39 ±3.60		0.004[a]
Male	52	25.10			4.76 ±2.67		
Literacy						-0.04	
Basic scholarship	112	56.60			6.07 ±3.40		
Bachelor's degree	68	34.30			5.74 ±3.52		0.765[b]
Master's and PhD degrees	18	9.10			5.78 ±3.42		
Household						-0.07	
Live alone	66	32.50			6.36 ±3.39		0.172[a]
Live together	137	67.50			5.80 ±3.48		
Religion						0.03	
Yes	116	58.60			5.87 ±3.33		0.631[a]
No	82	41.4			6.13 ±3.56		
Sport						-0.02	
Yes	141	70.90			6.05 ±3.42		0.641[a]
No	58	29.10			5.83 ±3.47		
Healthy						0.26*	
Yes	92	45.30			5.23 ±3.15		0.002[b]
Medium	99	48.80			6.26 ±3.29		
No	12	5.90			9.42 ±4.72		
Disease						-0.08	
Yes	60	30.60			6.43 ±3.72		0.325[a]
No	136	69.40			5.80 ±3.40		

[a]Mann-Whitney U Test; [b]Kruskal-Wallis Test; *Correlation is significance (p-value <0.05)

The PSQI-PT component descriptive statistics and the correlations between components are shown in Table 2. Each of the scores ranged from 0 to 3. The lowest inter-component correlation was between "use of sleep medications" and "habitual sleep efficiency" (r =0.12) and the highest correlation was between "habitual sleep efficiency" and "sleep duration" (r =0.52).

Table 2.

Pittsburgh Sleep Quality Index Component Correlations and Descriptive Statistics

	1	2	3	4	5	6	7
1. Subjective sleep quality	-						
2. Sleep latency	0.45	-					
3. Sleep duration	0.35	0.32	-				
4. Habitual sleep efficiency	0.28	0.42	0.52	-			
5. Sleep disturbances	0.22	0.32	0.13	0.12	-		
6. Use of sleep medication	0.20	0.14	0.17	0.12	0.17	-	
7. Daytime dysfunction	0.19	0.27	0.15	0.14	0.35	0.17	-
Mean	0.91	1.11	0.82	0.61	1.24	0.35	0.95
SD	0.98	0.91	0.71	0.92	0.56	0.82]	0.78

Using a recommended cut-off score of 5 (Buysse et al., 1989), 48.5% of participants were categorized as having a good sleep quality. Component-total correlations for all components ranged from 0.32 to 0.55, except for "use of sleeping medication," which was 0.24. The Cronbach's α for global sleep quality was 0.69, but increased to 0.70 if the "use of sleep medication" component was deleted from the reliability analysis; this indicates an adequate level of internal consistency (Schmitt, 1996).

KMO (0.731) and Bartlett (chi-square=142.922; df=21; $p < 0.001$) tests were performed and the results verified that factor analysis is suitable (Maroco, 2003) for this sample. Exploratory factor analysis (EFA) revealed (see Table 3) two components that loaded highly on factor 2 (but not on factor 1, i.e. "sleep disturbances" and "daytime dysfunction"), a result that was not consistent with Cole et al. (2006). The model properties verified good indices (chi-square=8.649; df=8; p=0.373), and there was a medium-sized effect (Cohen, 1988) for the correlation between the two factors (r=0.36). The use of sleep medication component did not load highly on either factor (0.302).

Table 3.

Exploratory factor analysis for PSQI-PT*

PSQI-PT Component	Factor 1	Factor 2
Subjective sleep quality	**0.544**	0.366
Sleep latency	**0.640**	0.617
Sleep duration	**0.712**	0.084
Habitual sleep efficiency	**0.721**	0.231
Sleep disturbances	0.257	**0.634**
Use of sleep medications	0.302	0.166
Daytime dysfunction	0.184	**0.607**
Variance explained (%)	30.225	10.350

*Maximum likelihood estimate extraction method and direct oblimin rotation. Bold values indicate that the component has adequate factor loadings on the respective factor. Interfactor correlation = 0.360

Confirmatory factor analysis (CFA) was performed on the single factor, two factor, and three factor models. The model fit statistics for each model are presented in Table 4. CFA was first performed to test the single factor scoring model suggested by Buysse et al. (1989). As shown in Table 4, the chi-square statistic was significant and the RMSEA value was high (0.107), which indicated a poor model fit. The standardized path coefficients for some components showed adequate loadings 0.51–0.67), except for sleep disturbances (0.33), the use of sleep medication (0.21), and daytime dysfunction (0.39), which had a lower coefficients. Next, the single factor model was tested again with the use of sleep medication component removed to examine whether this improved the model fit (model 2). As shown in Table 3, this had little effect, as the $\chi 2$ statistic and RMSEA value still indicated a poor fitting model.

Table 4.

Goodness of fit indices for each model

Model	χ^2 (df)	GFI	AGFI	CFI	RMSEA
1	30.147 (14)*	0.920	0.840	0.828	0.107
2	22.313 (9)*	0.932	0.840	0.850	0.121
3	16.222 (12)	0.958	0.901	0.955	0.059
4	10.163 (7)	0.968	0.903	0.964	0.067
5	16.120 (11)	0.958	0.894	0.945	0.068
6	1.214 (6)	0.977	0.918	0.986	0.046

*p<0.05. *Model 1*, the single factor model (Buysse et al., 1989); *model 2*, the single factor model without the use of sleep medication component; *model 3*, the two factor model from the EFA; *model 4*, the two factor model from the EFA without the use of sleep medication component; *model 5*, the three factor model (Cole et al., 2006); *model 6*, the three factor model (Cole et al., 2006) without the use of sleep medication component.

The two factor model identified through the EFA (model 3) was then tested. As shown in Table 4, the GFI, AGFI and CFI values were slightly lower than expected (≥0.97), which indicated a moderate adjustment (i.e. the other indices were good). The standardized path coefficients were all appropriate 0.46–0.71), with the exception of the use of sleep medication component which was much lower (0.19) (See Fig. 1). The two factor model was tested again without the use of sleep medication component (model 4), but that did not lead an improvement in the model fit indices (See Table 4).

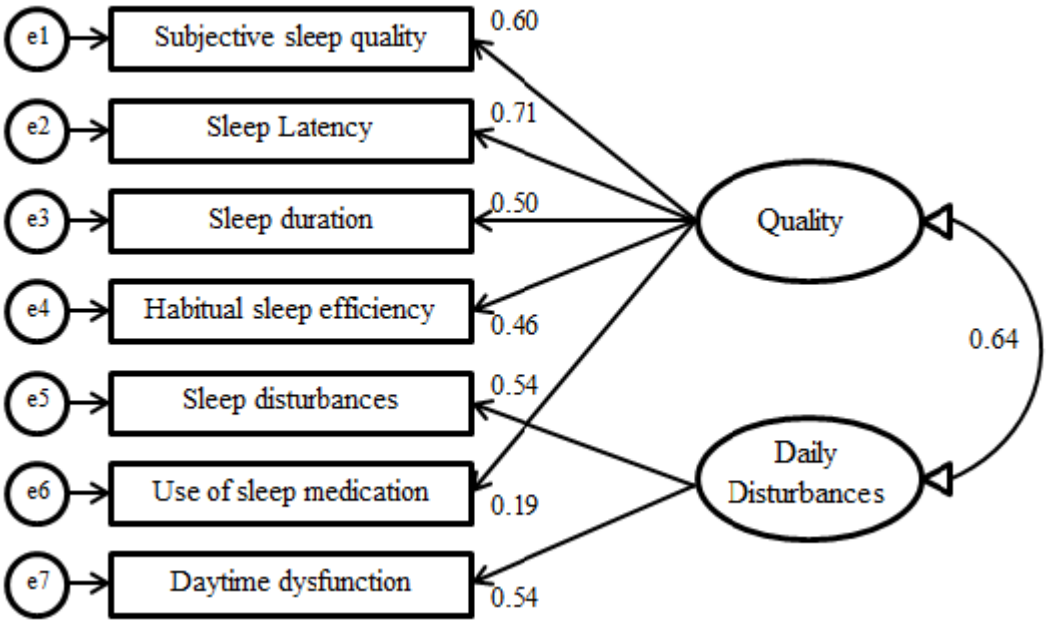

Figure 1. Factor loadings for the two factor model from the EFA (model 3).

The three factor model proposed by Cole et al. (2006) was then tested (model 5). The GFI, AGFI and CFI values were slightly lower than expected (≥0.97), which indicated a model moderate adjustment (i.e. the other indices were good). The standardized path coefficients were all appropriate 0.53–0.77), with the exception of the use of sleep medication component which was much lower (0.18) (See Fig. 2). The three factor model was tested again without the use of sleep medication component (model 6), and all of the model fit indices were appropriate, indicating a good fitting model (See Table 4). The standardized path coefficients were all appropriate 0.52–0.76) (See Fig. 3).

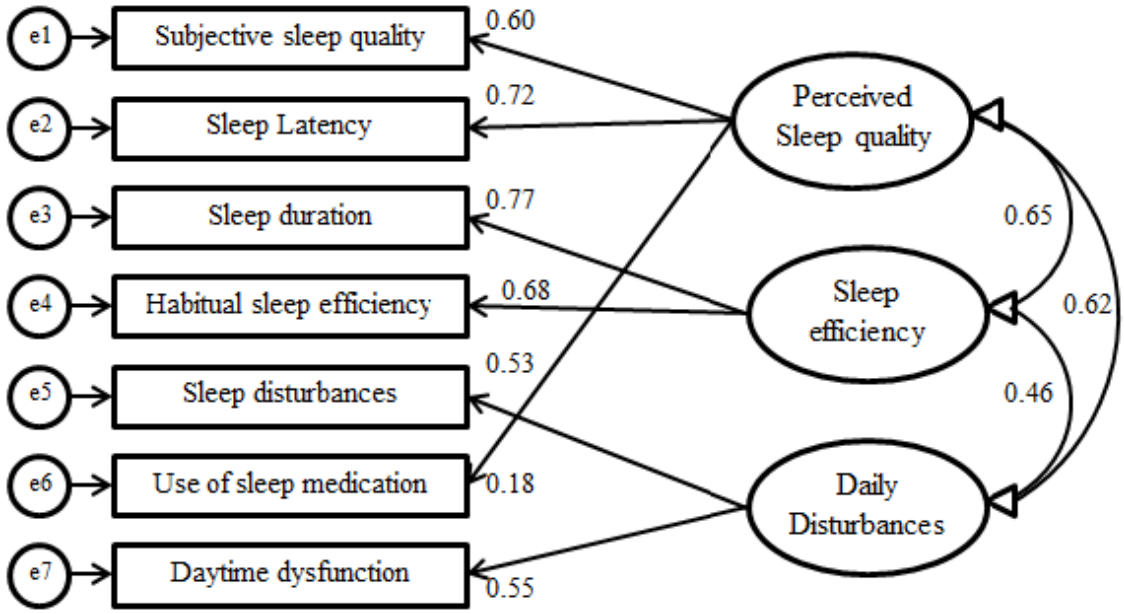

Figure 2. Factor loadings for the three factor model (model 5).

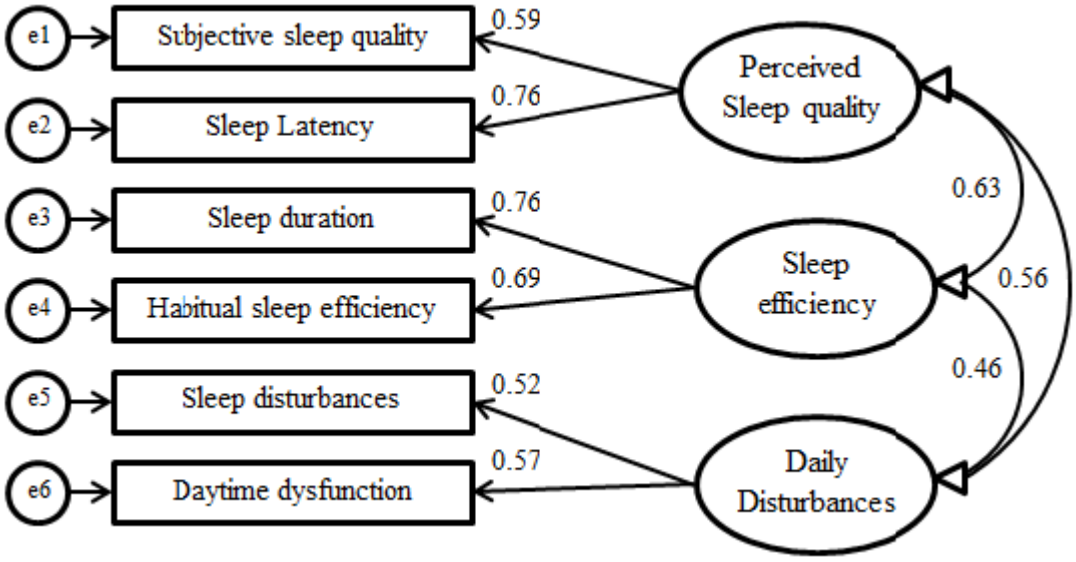

Figure 3. Factor loadings for three factor model without the use of sleep medication component (model 6).

Discussion

The present study examined the factor structure of the PSQI in a sample of older Portuguese adults using a cross-validation approach. Consistent with findings reported by Mollayeva et al. (2016), the current study found that the single-factor model is not the optimal factor structure for the PSQI. However, one must understand that the original scale author

chooses to use the global PSQI score because it demonstrated acceptable internal consistency in diverse populations and clinical settings, and correlations sufficiently representing each area of sleep quality. Thus, Buysse et al. (1989) were able to generalize the measure of sleep quality for different contexts. However, this does not occur homogeneously if was considered structural models with more than one factor.

The average global PSQI score is lower than that found in other investigations in non-clinical samples [6.65, 6.6] (Beaudreau et al., 2012; Bush et al., 2012), including in an older non-clinical sample [3.92, 5.1w −4.4 m] (D J Buysse et al., 1991; Grandner, Kripke, Yoon, & Youngstedt, 2006). The average global sleep quality score obtained in the present research is roughly equivalent to that in other non-clinical and older non-clinical samples. However, the score found in this study is closer to the general values of non-clinical samples than that found in the older non-clinical sample mentioned above; i.e., the GSQ in this research is low in relation to measurements of similar samples. But despite the overall value being higher than that found by Buysse et al. (1991) and Grandner et al. (2006), there is a similar GSQ difference between groups of men and women.

The sex differences in the GSQ values were observed in other studies (Buysse et al., 1991; Buysse, Hall, et al., 2008; Carpenter & Andrykowski, 1998; Knutson, Rathouz, Yan, Liu, & Lauderdale, 2006; Mondal, Gjevre, Taylor-Gjevre, & Lim, 2013). According to Mollayeva et. al (2016), if one considers the extensive evidence regarding biological differences between men and women in circadian clock genes, respiratory control, stress responses and the action of sex hormones on sleep mechanisms, sleep quality is likely to be influenced by sex. Therefore, it is important to characterize the existing sex differences in the GSQ in Portuguese older adults.

Another important variable to consider is "Healthy", i.e. the answers to the question: "Do you consider yourself a healthy person?". This issue is about the self-assessed healthiness. The answers to this question were significantly related to GSQ. Specifically, the worse their health perception is, the worse the perception of sleep quality.

The internal consistency (Cronbach's α) for the PSQI was 0.69, similar to values found in other studies with non-clinical samples (Babson, Blonigen, Boden, Drescher, & Bonn-Miller, 2012; Magee et al., 2008; Spira et al., 2012) and clinical samples (Mariman et al., 2012; Rener-Sitar, John, Bandyopadhyay, Howell, & Schiffman, 2014). Although the Cronbach's α we found was less than 0.70, the minimum value considered reliable for a scale (Schmitt, 1996), other studies have shown that when the “use of sleep medications” component was excluded, Cronbach's α was improved (Babson et al., 2012; Magee et al., 2008; Nicassio et al., 2014; Rener-Sitar et al., 2014; Skouteris, Wertheim, Germano, Paxton, & Milgrom, 2009; Spira et al.,

2012). When we deleted the “use of sleep medication” component, we achieved an adequate Cronbach's α of 0.70. As a consequence, we tested each model again with the use of sleep medication component removed, and this improved the model fit statistics.

The heterogeneity of models is expected between and within the different sample groups considered in each study (Mollayeva et al., 2016). The two-factor model found in the present study using EFA identified two distinct factors in sleep quality within the PSQI-PT, which were labeled “Quality” and “Daily disturbances”. As expected, this model does not correspond to the results of previous investigations. The reason is that the prevalence of sleep dysfunction and its main attributes varies between and within clinical and nonclinical samples, and what constitutes a good cut score is not a stable value (Mollayeva et al., 2016), causing the model to change for different sample groups.

The finding indicated that the best choose adapted model for this population is six, without "use of sleep medication" component. It should be noted that only 9.8% of our sample reported regular use of sleep medications (scores 2 and 3 in this question), which is not consistent with other studies with older adults. Therefore, the findings also indicated that the use of sleep medication component had consistently low factor loadings in both the EFA and the CFA.

Nevertheless, these findings potentially indicate that this component is not a meaningful measure of sleep quality in Portuguese older adults, where the use of sleep medication is low. However, this may be a false non-use of medication. Data from Saúde (2016) demonstrate that the Portuguese population has shown high consumption of tranquilizers and antidepressants; the latter has also shown an increase since 2011. Also, a recent epidemiological study confirmed the high consumption of psychotropic drugs in the Portuguese population, in which almost a quarter of women and one-tenth of men report use of anxiolytic drugs last year (Almeida et al., 2013). This suggests the possibility that the use of medications typically employed to improve the ability to sleep may be camouflaged by the use of other medications that do not necessarily have direct application for sleep complaints, but for others such as stress and anxiety. Thus, the patient may complain about other symptoms that do not involve sleep, and use medications to control these symptoms that have effect on sleep. Having a good perception of sleep quality about psychotropic drugs effect.

Therefore, because there is no information regarding the use of psychotropic drugs for these participants, we are limited to explain of the low score for “use of sleep medications”. However, one cannot ignore the current data on the use of psychotropic drugs by the Portuguese (this includes the older adults), and the information obtained by the component "use of sleep

medications". Given that reliability was best with that component excluded, and best model fit for the GSQ was also with this component excluded, we suggest that the information obtained about use of sleep medications is best used as a supplement to understanding the health status of the participants. The model shown in Fig. 3 (Model 6), the three factor model with the use of sleep medications component excluded, is the best-fitting one, and a three factor model is also the most consistent with what other studies of older adults have found.

Importantly, this study presents a major limitation in that we did not obtain specific data on health, or the use of psychotropic or other medications. We suggest, therefore, that those who use this model to evaluate sleep quality in older Portuguese adults take care to obtain this information. With this information you can have the most real possible scenario to reality, to join the information "drug use" for a reliable qualitative and comprehensive analysis of this model.

Conclusion

This research it is proposed the adaptation of 3-factor model for the PSQI in Portuguese older adults. The Cronbach's α was improved without “use of sleep medications” component. Therefore, the adaptation of the model is similar to the original model proposed by Cole et al. (2006), with the only change being to use the component "use of medications to sleep" as a complementary qualitative assessment of health rather than including it in the model. This will allow a more specific evaluation of the quality of older adults’ sleep in Portuguese scientific research.

Acknowledgements

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2.4 Estudo 4: Depression and Quality of Life in Portuguese Older Adults: effect of sleep quality mediation

Becker, N.B., Jesus, S. N., Stobäus, C. D., Guerreiro, M. (*submitted*) A Model of Sleep Quality, Mental Health, and Quality of Life in Portuguese Older Adults.

Abstract

Sleep insufficiency had a great importance when considering older adults and affect more than 45% of the world´s population. Thus, this research tested mediation hypothesis through path analysis that could explain how depression influences the quality of life considering the effects of sleep quality for Portuguese older adults. A sample of 204 community-dwelling older adults answered questions about sociodemographic status, quality of life, sleep quality, and depression. Descriptive and path analysis statistics were performed considering the results of normality test software. The results suggest that it is important to establish self-care practices to intervene in the ageing process and assist in adapting to later stages of life. Finally, it is important to consider sleep quality associated with depression, and, moreover, that the use of psychoeducational groups should be applied as a preventive approach to health.

Keywords: depression; older adults; quality of life; sleep quality.

Good sleep quality is effective in preventing premature ageing, as demonstrated in a pioneering study that found that sleep deprivation had a detrimental effect on metabolism and endocrine function (Spiegel, Leproult, & Van Cauter, 1999). In doing so, sleep insufficiency can worsen chronic health problems related to age (Spiegel et al., 1999). Thus, sleep insufficiency is a variable of great importance when considering older adults.

Considering that the World Health Organisation (2015) expects an increase from the current 841 million to 2 billion of the world's population to be over 60 years old by 2050, elderly well-being is a challenge to global public health. Unfortunately, elderly individuals live longer is not necessarily related to the quality of life; many older people depend on medications and medical and welfare care (World Health Organisation, 2015). This data shows the importance of increasing research efforts to explore how the health of older adults is affected by issues like sleep quality.

The negative impact of sleep insufficiency and poor sleep quality has been observed and demonstrated in the physical, emotional, mental, and social domains of life, both on a short- and long-term basis (Gottlieb et al., 2005; Gümüştekín et al., 2004; Taheri, Lin, Austin, Young, & Mignot, 2004; WASM, 2016; Zammit, Weiner, Damato, Sillup, & McMillan, 1999). There is also evidence in studies that shows a negative impact on psychological disorders such as depression, anxiety, and psychosis (Beusterien et al., 1999; Zammit et al., 1999). Therefore, emotion and sleep have been shown to be closely connected, and this issue is increasingly recognised as an important area of research (WASM, 2016).

In addition, the relation between sleep and emotions has been demonstrated as bi-directional and is reported by Kahn et al. (2013) as a ‘vicious cycle’ (p. 225). Sleep tends to compromise emotional regulation, which in many cases leads to an increase in negative emotion and interrupts sleep, leading to new deficiencies in emotional well-being (Kahn et al., 2013). For this reason, it is justified a new research that delineates how the relationship between sleep and emotions works, and the impact that this relationship may have on the quality of life. So, this study tested mediation hypothesis through path analysis that could explain how depression influences the quality of life considering the effects of sleep quality for Portuguese older adults.

Methods

Participants

A convenience sample of 204 community-dwelling older adults was included. The inclusion criteria for participants were: (a) older than 60 years; (b) ability to understand, read, and write in Portuguese; (c) not living in a nursing home; and (d) not requiring permanent medical care in a specific locale. Participants were excluded if they lacked the mental clarity to complete the scales or comprehend the questions. All participants in this research freely consented to answer the questionnaire.

Measures

Sociodemographic variables included in the questionnaire were: age (in years); gender (male/female); highest level of education completed (primary or secondary education, graduate, postgraduate, Master's, or PhD); family status (live alone or in cohabitation); sports activities (play or not play sports); healthy (consider themselves as healthy); and retirement status.

Sleep quality was evaluated by the Portuguese version of the Pittsburgh Sleep Quality Index (PSQI-PT; João, Becker, Jesus, & Martins, 2017). The questionnaire is comprised of 19 self-report questions that are grouped into seven components and graded from 0 to 3. The PSQI components include the following: (a) subjective sleep quality; (b) sleep latency; (c) sleep duration; (d) habitual sleep efficiency; (e) sleep disturbances; (f) use of sleeping medication; and (g) daytime dysfunction. The sum of these components yields one global score, which ranges from 0 (*no difficulty*) to 21 (*severe difficulties*), where the highest score indicates the worst sleep quality. A global PSQI score greater than 5 indicates major difficulties in at least two components or moderate difficulties in more than three components (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989).

For the purposes of this study, depression was evaluated by the Portuguese version of the Depression Anxiety Stress Scales (DASS-21; Pais-Ribeiro, Honrado, & Leal, 2004). This questionnaire is comprised of 21 self-report questions, separated into three scales (depression, anxiety and stress), with seven items in each scale graded from 0 to 3. Participants evaluate the degree to which they experience each symptom during the previous week. The results of depression scale are determined by the sum of results for the seven items, where the minimum is 0 and the maximum 21. The highest notes on scale correspond to more negative emotional states (Antony et al., 1998; Pais-Ribeiro et al., 2004).

The quality of life was evaluated per two scales. The first scale, WHOQOL-Bref (abbreviated version of the WHOQOL-100), was created by the World Health Organisation

Quality of Life (Vaz Serra et al., 2006; WHO, 1997), and it is a questionnaire comprised of 26 self-report questions grouped into four domains: (a) *Physical Health* [pain and discomfort, energy and fatigue, sleep and rest, mobility, activities of daily living, dependence on medication and treatment, and work capacity]; (b) *Psychological* [positive feelings, thinking about learning, memory, concentration, self-esteem, body image and appearance, negative feelings, spirituality, religion, and personal beliefs]; (c) *Social Relationships* [personal relationships, social support, and sexual activity]; and (d) *Environment* [physical security and protection, home environment, financial resources, health and social care (availability and quality), opportunities to acquire new information and skills, participation in and recreation / leisure opportunities, physical environment (pollution, noise, climate, transit), and transportation]. The second scale, WHOQOL-Old, was created by the World Health Organisation Quality of Life (WHO, 2006), and should be applied together with the WHOQOL-Bref. This questionnaire is comprised of 24 self-report Likert questions that are grouped into six domains: (a) operation of sensorial; (b) autonomy; (c) past activities, gifts, and future; (d) social participation; (e) death and dying; and (f) intimacy. The scores from these six domains—or the values of the 24 items from the WHOQOL-Old—are combined to produce a general overall quality-of-life score for older adults, denoted here as the *ageing* domain. Therefore, the quality of life measure was evaluated for five domains (i.e., four domains related to WHOQOL-Bref and one domain related to WHOQOL-Old) that scored in the range of 0 to 100.

Statistical Analysis

A total of 204 questionnaires were completed and checked for data entry errors, missing data, or the presence of major outliers. Data analyses were performed with SPSS software version 21 and AMOS version-29. The DASS-21, WHOQOL-Bref, WHOQOL-Old, and PSQI were computed; each had small amounts of missing data, with no more than 5% missing for any composite. An single-point multiple imputation procedures for missing data replacement (Schafer & Graham, 2002) was conducted for the missing points.

Descriptive statistics were computed for each sociodemographic, depression (Depression scale - DASS-21), quality of life (physical health, psychological, social relationships, social relationships, environment and aging domains - WHOQOL-Bref and WHOQOL-Old), and sleep quality (PSQI-PT) variables, and their reliability were examined (i.e., Cronbach's alpha [α] was computed). Descriptive statistics were calculated as frequencies (%) for categorical variables, whereas means and standard deviations were computed for continuous variables.

To test the mediation hypothesis was used path analysis technique. The significance of the regression coefficients was evaluated after the estimation of the parameters by the maximum likelihood method implemented in the AMOS-21 software (AMOS Development Corporation, Spring House, PA, USA). The existence of outliers was evaluated by the square distance of Malahanobis (D^2), and the normality of the variables was evaluated by the uni- and multivariate coefficients of asymmetry (sk) and kurtosis (ku). All variables showed adequate normality as reported by Maroco (2014). Three observations showed D^2 values that would suggest their removal as outliers; therefore, the analysis was made without these observations.

The significance of direct, indirect, and total effect was assessed with Bootstrap resampling as described in Maroco (2014). The effects with $p \leq 0.05$ were considered significant. The adjustment of the model was assessed using several statistical indices including a chi-square test (non-significant values indicate good model fit), the root mean square error of approximation (RMSEA; values ≤ 0.08 indicate close approximate fit), and the comparative fit (CFI), goodness of fit (GFI), and adjusted goodness of fit (AGFI) indices (values > 0.97 indicate good model of fit) (Hair, Black, Babin, & Anderson, 2010).

Ethical Aspects

This research was performed in accordance with the European research guidelines. All participants in this research freely consented to answer the questionnaires and signed an informed consent form before inclusion in the study.

Results

The results of the descriptive analysis regarding sociodemographic characteristics and each measure are in Table 1.

Table 1.

Descriptive analysis

	N	%	Mean	SD
Age (years)			70.05	7.15
Gender				
Female	152	74.90		
Male	52	25.10		
Education				
Basic scholarship	112	56.60		
Bachelor's degree	68	34.30		
Master's and PhD degrees	18	9.10		
Family status				
Live alone	66	32.50		
Co-habitate	137	67.50		
Sport				
Yes	141	70.90		
No	58	29.10		
Healthy				
Yes	92	45.30		
Medium	99	48.80		
No	12	5.90		
Retired				
Yes	179	88.20		
No	24	11.80		
Sleep Quality	$\alpha = 0.690$		6.00	3.46
Quality of Life	$\alpha = 0.886$			
Physical health domain			74.61	15.94
Psychological domain			62.03	10.95
Social relationships domain			71.96	15.40
Environment domain			74.90	12.68
Quality of life (Aging)	$\alpha = 0.843$		71.71	9.51
Depression	$\alpha = 0.896$		4.60	5.13

The model fit statistic showed a good adjusted model (Chi-square (df)=8.47(5), p=0.132; RMSEA=0.05; CFI=0.994; GFI=0.999; AGFI=0.926). The adjusted model accounts for 32% of the physical health domain, 28% of the psychological domain, 19% of the social relationships domain, 13% of the environment domain and 29% of the ageing domain of quality of life. All trajectories are statistically significant, with the exception of the effect of sleep quality on the environmental domain (i.e., the indirect effect of depression in the environmental domain is not statistically significant as well) some show a negative effect. Gender is a control variable for sleep quality. Figure 1 shows the model with the standardised estimates of the regression coefficients and the R^2 of the domains of quality of life.

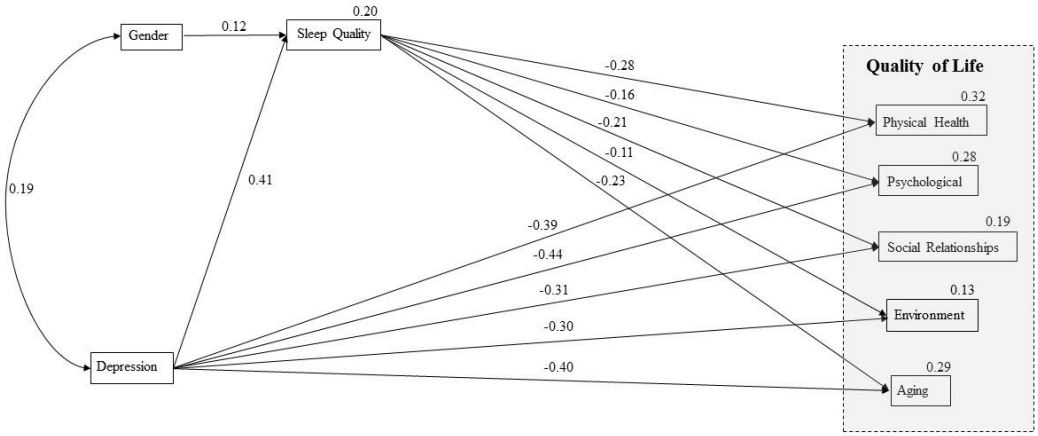

Figure 1. Adjusted model to effect of sleep quality mediation.

Respecting the mediation assumptions (Maroco, 2014), the effects and their respective significance were calculated for each tested hypothesis (Table 2). It is verified that sleep quality mediated the effect of depression with all domains of quality of life, with the exception of the environment domain.

Table 2.

Standardised effects of mediation of sleep quality to quality of life*

Hypothesis	**Direct effect without mediator**	**Direct effect with mediator**	**Indirect effect**
Depression to physical health domain	-0.51 (p<0.001)	-0.39 (p=0.001)	-0.12 (p=0.001)
Depression to psychological domain	-0.51 (p<0.001)	-0.43 (p=0.001)	-0.06 (p=0.018)
Depression to social relationships domain	-0.40 (p<0.001)	-0.31 (p=0.001)	-0.09 (p=0.013)
Depression to environment domain	-0.35 (p<0.001)	-0.30 (p=0.001)	-0.05 (p=0.123)
Depression to aging domain	-0.50 (p<0.001)	-0.40 (p=0.001)	-0.09 (p=0.001)

*Standardized effects= β.

Discussion

The present study attempted to confirm whether sleep quality mediates the effects of depression on quality of life for Portuguese older adults. The age range of the sample used in the present study introduces some important criteria due to the fact that the participants had autonomy to perform daily activities. This criterion differs from other studies where the lack of autonomy was considered a factor (Martin et al., 2010; Orhan et al., 2012). The study also finds that this population is considered to be healthier because they do not report having a disease, they consider themselves as healthy (45.30%) or moderately healthy (48.80%), and practice some sports activity (70.90% i.e., they are non-sedentary). Therefore, this is a sample of participants that follows the latest recommendations of the World Health Organisation (2015) to invest in research that addresses more health issues—not just 'diseases'—in an attempt to develop fundamental health research on ageing. Therefore, the results that follow attempt to understand the functioning of Portuguese older adults within a health perspective. To carry this out, a model has proposed in which sleep quality acted as a mediator between the effects of depression and quality of life for Portuguese older adults.

Investigations focusing on the population of healthy elderly adults have found that the results of reports which used objective measures of sleep (e.g., polysomnography [PSG]) show

poorer sleep quality than results from subjective reports (Maglione et al., 2012). However, this difference also occurs when sleep was associated with depressive symptoms; it is also important to mention that, whilst this combination is not significant when considering objective measures, it is significant when using subjective measures (Maglione, Ancoli-Israel, et al., 2012; Paudel et al., 2008).

This divergence in reports using objective versus subjective measures can be explained by the multifactorial structure of the sleep dysfunction construct, which causes confusion in diagnosis with respect to determining which people need a deeper investigation of the aetiology of their complaints (Mollayeva et al., 2016). This characterises a challenge in primary and specialised medical care.

In this research, depression is characterised as loss of self-esteem and motivation and is associated with the perception of the low probability of achieving life goals that are meaningful to the individual (Lovibond & Lovibond, 1995). Therefore, the depression subscale of DASS measures the core symptoms of depression, i.e. cognitive symptoms of depression. In older adults, the physical symptoms and consequent reactive emotion to physical diseases often mimic vegetative and affective symptoms of depressive disorders. Thus, cognitive symptoms of depression are highly valid and specifically useful for differentiating older people's pathological depression.

Previously, it was verified that depression was associated with subjective sleep disturbances in a meta-analysis ($r0 = 0.42$, $p < 0.001$; Becker, Jesus, João, Viseu, & Martins, 2016) and in other papers (Dzierzewski et al., 2015; Maglione et al., 2012; Orhan et al., 2012; Park et al., 2013; Potvin, Lorrain, Belleville, Grenier, & Préville, 2014; Rashid & Tahir, 2015). Thus, sleep quality was considered an important variable influencing depression and other variables like quality of life.

The adjusted model used in this research demonstrates that poor sleep quality is capable of mediating the effect of depression on quality-of-life domains, except on the environmental domain. In consonance, other papers showed that poor sleep quality has been observed and demonstrated as having a long- and short-term negative impact on physical, emotional, mental, and social life domains (Gottlieb et al., 2005; Gümüştekín et al., 2004; Taheri et al., 2004; WASM, 2016; Zammit et al., 1999). Therefore, aspects of the environment domain were not previously addressed as a factor associated with sleep quality, corroborating the findings of this investigation. However, in the proposed model that had its main focus on sleep quality, there was no significant effect.

No studies were found to discuss the role of sleep quality as a mediator of the effect of depression on quality of life. However, research showed that the relationship between sleep, depression, and quality of life manifests in Portuguese older adults when sleep problems lead to poor quality of life and increase the risk of depression (M. G. Cole & Dendukuri, 2003; Schubert et al., 2002). Still, other studies also indicate that subjective sleep disturbance increases the risk of depression (Breslau, Roth, Rosenthal, & Andreski, 1996; Buysse et al., 2008; Franzen, Siegle, & Buysse, 2008; Livingston, Blizard, & Mann, 1993; Maglione et al., 2014; Roberts, Shema, Kaplan, & Strawbridge, 2000). On the other hand, research has shown that depression has been the factor that most influences sleep quality in older adults (Buysse, 2004; Cho et al., 2009; McHugh, Casey, & Lawlor, 2011; Park et al., 2013). Thus, the results demonstrate that depression treatment should focus on both mental health and sleep quality (Buysse, 2004; Yao, Yu, Cheng, & Chen, 2008).

This research adds the role of sleep quality as a "carrier" of the effect of depression on quality of life. Therefore, health care should pay more attention to the quality of sleep for older adults and provide educational programs for management of sleeping difficulties (Park et al., 2013). By maintaining an adequate sleep quality, we can act in a preventive way with depression, since poor sleep quality sleepers were found to have tendencies towards depression (S. Henderson et al., 1995; Hsu, 2001). A preventive approach will assist with maintaining a better quality of life in Portuguese older adults, and for over a longer period of time.

Importantly, this study presents a limitation about the sample size to use different analysis techniques on another model to evaluation sleep quality (Becker & Jesus, 2017). Thus, in future studies, it is necessary to use a larger sample that includes moderation analyses using the sleep quality assessment model proposed by Becker and Jesus (2017).

We conclude that it is important to establish self-care practices for people who are able to explore the way they are living during the ageing process and to assist in adapting to this transitional moment in life by trying to minimise the impacts of depression. At the same time, a subjective sleep quality screening and psychoeducational groups may be able to establish a preventive approach to depression in Portuguese older adults.

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2.5 Estudo 5: Sleep quality, quality of life and satisfaction with life in Portuguese older adults: effect of optimism mediation

Becker, N.B., Jesus, S. N., Stobäus, C. D. (*in preparation*) Sleep quality, quality of life and satisfaction with life in Portuguese older adults: effect of optimism mediation.

Abstract

Adequate sleep quality is essential for health maintenance. Understanding the importance of sleep for health, this study aims to test mediation hypothesis that could explain how sleep quality influences the satisfaction with life and quality of life considering the mediation effect of optimism for Portuguese older adults. A convenience sample of 204 community-dwelling older adults answering questions about sociodemographic status, sleep quality, quality of life, satisfaction with life and optimism. Descriptive and path analysis statistics were performed considering the results of normality test software. The results suggested that optimism is a significant mediator with an importance reduction on the effect the poor sleep quality to satisfaction with life and quality of life. These results suggested that is important to investigate and develop intervention programs that promoting a good sleep health focusing in optimism for a better satisfaction with life and quality of life. Finally, it is an important topic to investment in new approaches to ageing to contribute a well-being in older adults.

Keywords: older adults; optimism; quality of life; satisfaction with life; sleep quality

Evidence indicates that sleep is essential to preserve the adaptive emotional reactions and, therefore, insufficient sleep and poor quality can hinder the operation and/or the individual's emotional response (Kahn, Sheppes, & Sadeh, 2013). The negative impact of sleep to both short and long term is associated with psychological disorders such as depression, anxiety and psychosis (Beusterien et al., 1999; Zammit et al., 1999). Thus, sleep problems are considered a global epidemic that affects about 45% of world population (Wade et al., 2008), becoming it's an important subject to the health sector.

The literature has shown that negative emotions such as stress, sadness, regret, and, anger have, in many cases, harmful consequences on sleep (Mayers & Baldwin, 2006; Schmidt & Van der Linden, 2009; Talbot, Hairston, Eidelman, Gruber, & Harvey, 2009). On the other hand, the effect of the positive emotional states (welfare variables such as optimism, hope, happiness, remission, etc.) on sleep has received less attention between the researchers (Kahn et al., 2013), and even less if we consider elderly samples (Becker, João, Jesus, Bonança, & Martins, 2016). Probably this is due to an attempt to increase knowledge of the etiological factors of sleep problems (Kahn et al., 2013) and thus it is more likely that the initial investigations are related to negative emotions.

In spite of the reduced attention of current research on the effect of positive emotional states in sleep quality and even the tartar it in the elderly; literature a recent review has shown the importance of developing more research to address the well-being in older adults (Becker et al., 2016). The world has aged relatively quickly, however, despite the population is living on average increasingly years is not directly related to the quality of life, depending currently on drugs or being kept in the specialised institutions (World Health Organization, 2015). Understanding that adequate sleep quality is essential for health maintenance (WASM, 2016), and development of new processing approaches for older people its requirement (World Health Organization, 2015), It is essential to develop knowledge about the welfare of the relationship and sleep quality in the elderly.

So, investigate positive affective states, how optimism may be able to bring new knowledge, either as a possible etiologic agent of sleep disorders or as a protective factor that may be relevant to the development of sleep treatments (Kahn et al., 2013). Have recently been reported the importance that sleep quality generates the maintenance of health (WASM, 2016) and that it is necessary to develop research on the well-being of older adults (Becker et al., 2016). Therefore, the goal of the present study was to tested mediation hypothesis that could

explain how sleep quality influences the satisfaction with life and quality of life considering the mediation effect of optimism for Portuguese older adults.

Methods

Sample

A convenience sample of 204 community-dwelling older adults (Mean = 70.05 years; SD = 7.15 years; range = 60 – 90); of this total 152 participants were female sex (74.9%). The selection of this sample was used the following inclusion criteria: (a) have more than 60 years; (b) ability to understand, read and write in Portuguese; (c) does not live in the nursing home; and, (d) does not require permanent medical care in a specific local. The people are excluded if lacked mental clarity about the scales, or could not read the questions. All people who participated in this research accepted by free consensus to answer the questionnaire.

Measures

Sociodemographic variables included in the questionnaire: age (years); gender (male/female); retirement status; sports actives (play or not play sports); and health (consider themselves as healthy).

The sleep quality was evaluated by Portuguese version Pittsburgh Sleep Quality Index – PSQI-PT (João et al., 2017). The questionnaire comprises of 19 self-report questions that are grouped into seven (7) components, graded on a score that ranges from 0 to 3. The PSQI components are the following: a) subjective sleep quality, b) sleep latency, c) sleep duration, d) habitual sleep efficiency, e) sleep disturbances, f) use of sleeping medication, and g) daytime dysfunction. The sum of these components yields one global score, which ranges from 0 (no difficulty) to 21 (severe difficulties), where the highest score indicates worst sleep quality. A global PSQI-PT score greater than 5 indicates major difficulties in, at least, two (2) components or moderate difficulties in more than three (3) components (Daniel J. Buysse et al., 1989). The internal consistency for the present study, estimated by Cronbach's alpha, was $\alpha = 0.690$.

The quality of life was evaluated per WHOQOL-Bref and WHOQOL-Old. The first scale, WHOQOL-Bref (abbreviated version of the WHOQOL-100), was created by the World Health Organisation Quality of Life (WHO, 1997) and was adapted for Portugal Portuguese (Vaz Serra et al., 2006). It is a questionnaire comprised of 26 self-report questions grouped into four domains: (a) *Physical Health* [pain and discomfort, energy and fatigue, sleep and rest, mobility, activities of daily living, dependence on medication and treatment, and work

capacity]; (b) *Psychological* [positive feelings, thinking about learning, memory, concentration, self-esteem, body image and appearance, negative feelings, spirituality, religion, and personal beliefs]; (c) *Social Relationships* [personal relationships, social support, and sexual activity]; and (d) *Environment* [physical security and protection, home environment, financial resources, health and social care (availability and quality), opportunities to acquire new information and skills, participation in and recreation / leisure opportunities, physical environment (pollution, noise, climate, transit), and transportation]. The second scale, WHOQOL-Old, was created by the World Health Organisation Quality of Life (WHO, 2006), and adapted for Portugal Portuguese (Vilar, 2015). This scale should be applied together with the WHOQOL-Bref. This questionnaire is comprised of 24 self-report Likert questions that are grouped into six domains: (a) operation of sensorial; (b) autonomy; (c) past activities, gifts, and future; (d) social participation; (e) death and dying; and (f) intimacy. The scores from these six domains—or the values of the 24 items from the WHOQOL-Old—are combined to produce a general overall quality-of-life score for older adults, denoted here as the *ageing* domain. Therefore, the quality of life measure was evaluated for five domains (i.e., four domains related to WHOQOL-Bref and one domain related to WHOQOL-Old) that scored in the range of 0 to 100. The internal consistency for the present study, estimated by Cronbach's alpha, was α=0.886 (WHOQOL-Bref) and α=0.843 (WHOQOL-Old).

Satisfaction with life was evaluated per Satisfaction with Life Scale -SWLS (Simões, 1992), that comprises of 5 self-reports Likert questions (seven points). This scale attempts to evaluate the subjective judgment that individuals make about the quality of their own lives. The items of the instrument are global leading the individual to weigh the domains of their lives according to their own values and allowing a global judgment on life satisfaction. The internal consistency for the present study, estimated by Cronbach's alpha, was α = 0.852.

The positive emotions were represented for optimism. Optimism was selected because it is one of the most researched variables of well-being (Oliveira-Barros, 2010). The optimism was evaluated per Optimism Scale (Barros, 1998) that comprises of 4 self-reports Likert questions (five points). This scale attempts to measure the willingness of the individual to expect positive results in a rational way, that is, this scale translates into the expectations that the elderly has about their future. The internal consistency for the present study, estimated by Cronbach's alpha, was α = 0.871.

Statistical analysis

A total of 204 questionnaires were completed and checked for data entry errors, missing data, or the presence of major outliers. Data analyses were performed with SPSS software version 21 and AMOS version-29. The WHOQOL-Bref, WHOQOL-Old, SWLS, Optimism Scale, Hope Scale, and PSQI-PT were computed; each had small amounts of missing data, with no more than 5% missing for any composite. A single-point multiple imputation procedure for missing data replacement (Schafer & Graham, 2002) was conducted for the missing points.

Descriptive statistics were computed for each sociodemographic, quality of life, optimism, hope and sleep quality, and their reliability was examined (i.e., Cronbach's alpha [α] was computed). Descriptive statistics were calculated as frequencies (%) for categorical variables, whereas means and standard deviations were computed for continuous variables.

To test the mediation hypothesis was used path analysis technique. The significance of the regression coefficients was evaluated after the estimation of the parameters by the maximum likelihood method implemented in the AMOS-21 software (AMOS Development Corporation, Spring House, PA, USA). The existence of outliers was evaluated by the square distance of Malahanobis (D^2), and the normality of the variables was evaluated by the uni- and multivariate coefficients of asymmetry (*sk*) and kurtosis (*ku*). All variables showed adequate normality as reported by Maroco (2014). Four observations showed D^2 values that would suggest their removal as outliers; therefore, the analysis was made without these observations.

The significance of direct, indirect, and total effect was assessed with Bootstrap resampling as described in Maroco (2014). The effects with $p \leq 0.05$ were considered significant. The adjustment of the model was assessed using several statistical indices including a chi-square test (non-significant values indicate good model fit), the root mean square error of approximation (RMSEA; values ≤0.08 indicate close approximate fit), and the comparative fit (CFI), goodness of fit (GFI), and adjusted goodness of fit (AGFI) indices (values > 0.97 indicate good model of fit) (Hair Jr. et al., 2010).

Ethical aspects

This research was performed in accordance with the European research guidelines. All participants in this research freely consented to answer the questionnaires and signed an informed consent form before inclusion in the study.

Results

The results of the sociodemographic characteristics showed that 70.9% play sport, 88.2% are retired, and 45.3% consider themselves health and 48.8% medium health. The

descriptive analysis showed the mean (M) and the standard deviation (SD) was: sleep quality (M = 6.0 SD = 3.5), optimism (M = 14.1 SD = 3.5 α = 0.871), satisfaction with life (M = 16.47 SD = 3.99 α = 0.852), and quality of life [WHOQOL-Bref (α = 0.886): Physical health domain (M = 74.6 SD = 15.9), psychological domain (M = 62.0 SD = 10.9), social relationships domain (M = 71.9 SD = 15.4), environment domain (M = 74.9 SD = 12.7); WHOQOL-Old (α = 0.843): Aging (M = 71.7 SD = 9.5)].

The model fit statistic showed a good adjusted model (Chi-square/df= 1.98, p=0.053; RMSEA=0.07; CFI=0.991; GFI=0.985; AGFI=0.905). The adjusted model accounts for 30% of the physical health domain, 34% of the psychological domain, 25% of the social relationships domain, 17% of the environment domain, 35% of the ageing domain of quality of life and 36% of the satisfaction with life. Gender is a control variable for sleep quality. Figure 1 shows the model with the standardised estimates of the regression coefficients and the R^2 of the domains of quality of life and satisfaction with life.

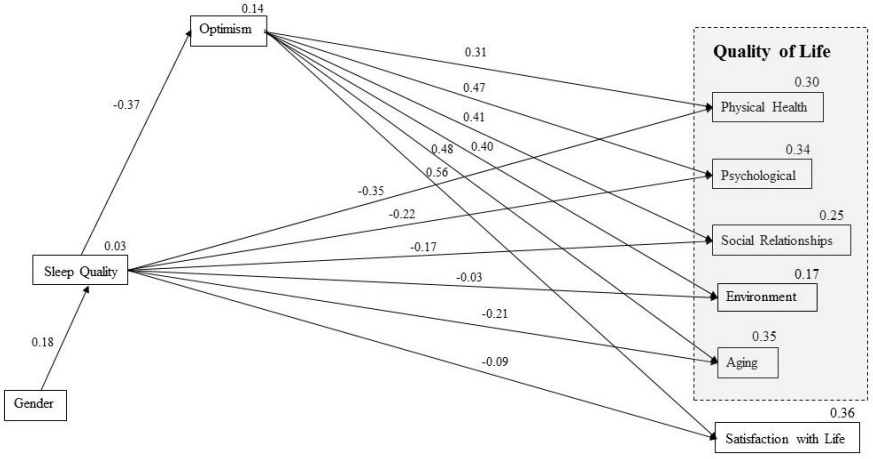

Figure 1. Adjusted model to effect of optimism mediation.

Respecting the mediation assumptions (Maroco, 2014), the effects and their respective significance were calculated for each tested hypothesis (Table 1). It's verified that optimism partially mediated the effect of sleep quality with physical health, psychological, social relations and ageing domains of quality of life. But, optimism total mediated the effect of sleep quality with environment domain of quality of life and, satisfaction with life.

Table 1.

Standardised effects of mediation of optimism to the quality of life and satisfaction with life.*

Hypothesis	**Direct effect without mediator**	**Direct effect with mediator**	**Indirect effect**
Optimism to physical health domain	-0.46 (p <0.001)	-0.35 (p = 0.002)	-0.11 (p <0.001)
Optimism to psychological domain	-0.39 (p <0.001)	-0.22 (p = 0.002)	-0.17 (p <0.001)
Optimism to social relationships domain	-0.32 (p <0.001)	-0.17 (p = 0.033)	-0.15 (p = 0.001)
Optimism to environment domain	-0.18 (p = 0.011)	-0.03 (p = 0.675)	-0.15 (p = 0.001)
Optimism to aging domain	-0.39 (p <0.001)	-0.21 (p = 0.001)	-0.18 (p <0.001)
Optimism to satisfaction with life	-0.30 (p <0.001)	-0.09 (p = 0.136)	-0.21 (p = 0.001)

Discussion

The present study is the first to evaluate how sleep quality influences the satisfaction with life and quality of life considering the mediation effect of optimism for Portuguese older adults. At moment, the literature has appointed to well-being is associated with good sleep quality (Jackowska, Ronaldson, Brown, & Steptoe, 2016; Lau, Hui, Lam, & Cheung, 2017; Ryff, Singer, & Dienberg Love, 2004; Steptoe, O'Donnell, Marmot, & Wardle, 2008) and the positive emotions may have a correspondingly positive influence on sleep, although the lack of experimental findings does not permit any consistent conclusion (Kahn et al., 2013). Our results demonstrate that optimism can reduce or nullify the effect of poor sleep quality on the quality of life and satisfaction with life. Thus, it is confirmed that the optimism is beneficial to health (Seligman, 1990).

In this investigation, we verified that optimism is a variable that exerts total mediation on the effect of sleep quality under satisfaction with life and with the environmental domain of quality of life. Also, the optimism is partially mediator to the effect of sleep quality in the domains (a) physical, (b) psychological, (c) social relationships, and (d) ageing. If the optimism

can be characterised as a characteristic or important dimension of the personality and, more concretely, a style cognitive-affective about how the subject processes the information about the future (Oliveira-Barros, 2010); i.e., a process of thinking about the goals of the person, accompanied by the motivation to act in that direction (agency) and to find the means (pathways) to reach the respective objectives (Snyder, 1995, p. 355). Therefore, it is possible to understand that this variable can corroborate significantly for the best quality of life and satisfaction with life when considering the effects of poor sleep quality.

These findings demonstrate that optimism is an important variable to be investigated when we consider its influence on sleep quality, as well as the promotion of better quality and satisfaction with life. Seligman (1990) suggested four aspects that show how the optimism benefits the health of people: "1. Optimism might affect your health across your lifetime is by preventing helplessness and thereby keeping immune defences feistier; 2. Optimism should produce good health concerns sticking to health regimens and seeking medical advice; 3. Optimism should matter for health concerns the sheer number of bad life events encountered; 4. The final reasons that optimists should have better health concerns social support. The capacity to sustain deep friendships and love seems to be important for physical health" (p.179).

Moreover, some studies have reported that optimism has a positive relationship and bidirectional causality with the sleep quality (Jackowska et al., 2016; Lau et al., 2017; Uchino et al., 2017). If we consider research at older ages about subjective well-being and health, we will see that it is very relevant to the quality of life and is at an early stage (Steptoe, Deaton, & Stone, 2015). Therefore, optimism can be considered as an important variable in the development of the intervention procedures that promote an adequate sleep quality, mainly, in Portuguese older adults.

Despite the studies that investigated the relationship between sleep quality and optimism to be scarce (Beattie, Kyle, Espie, & Biello, 2015). It is relevant, in this context and considering the importance that sleep has on quality of life, well-being and in the control of depression symptoms (Becker & Jesus, 2017), the intervention programs with an approach based on positive psychology can strongly contribute to the sleep health, improving the well-being (Ho et al., 2014; Proyer et al., 2014). But it is necessary to continue to investigate more aspects of positive variables and your relation with sleep quality in other health populations.

In conclusion, this study confirmed the importance of the positive psychology, namely, the optimism as an interesting approach to performing in intervention programs, that promoting a good sleep health. Finally, responding to the need for investment in new approaches to ageing (World Health Organization, 2015) and, to contribute to life quality our study suggest that in

further researches be tested effective interventions, which lead to the sleep hygiene, stimulating the optimism, well-being and life quality in older adults.

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3. CONCLUSÕES

Como reportado anteriormente, há uma crescente necessidade de investigações que englobem questões relativas à saúde das pessoas, e especialmente na população idosa (World Health Organization, 2015). Considerando o sono uma necessidade fisiológica importante para a manutenção da saúde (Buysse, 2014), o principal objetivo desta tese foi explorar a qualidade do sono em pessoas idosas de forma a verificar às suas implicações na qualidade de vida, e descrever de que maneira esta temática pode permear a prevenção da depressão em idosos.

Apesar do sono estar relacionado com aspectos da doença, devido a diversas razões, e.g. a redução de financiamentos em pesquisa, a qual tem ameaçado a execução de investigações básicas e clínicas (Strollo et al., 2011); nunca foi tão importante demonstrar a razão de investigar o sono para a produção de conhecimentos para o desenvolvimento de práticas mais eficazes nesta temática. E, neste caso, demonstrar e investigar o sono a partir da perspetiva subjetiva, a qual apresenta custos mínimos na investigação e, muitas vezes, são os sintomas subjetivos que são representados como mais impactantes para as pessoas do que a disfunção do sono (Paudel et al., 2008).

Essas razões culminaram nos dois primeiros estudos desta tese, que tratam da revisão de investigações sobre, nomeadamente, depressão e qualidade do sono (estudo 1) e da psicologia positiva e pessoas mais velhas (estudo 2). Inicialmente verificámos que haviam investigações que relacionavam a depressão e a pobre qualidade do sono, entretanto, não haviam meta-análises sobre esta relação. Foi realizada a meta-análise desta temática encontrando-se uma correlação moderada entre qualidade do sono e depressão, a qual é influenciada por moderadores, indicando a importância na atenção à qualidade do sono de idosos com sintomas depressivos. Assim, a falta de uma boa qualidade do sono de uma pessoa mais velha provavelmente está relacionada com sintomas depressivos.

Estes achados traduzem sinteticamente os resultados de pesquisas com pessoas com mais de 60 anos e que qualitativamente relatam a depressão como estando associada com a qualidade subjetiva do sono (Becker et al., 2017; Dzierzewski et al., 2015; Rashid & Tahir 2015; Potvin et al., 2014), e a ausência de boa qualidade do sono numa pessoa mais velha relacionada com sintomas depressivos (Cole & Dendukuri, 2003; Schubert et al., 2002). Este facto demonstra a bidirecionalidade da relação entre a qualidade subjetiva do sono e sintomas depressivos/depressão, bem como a sua importância.

Este cenário prospeta a necessidade de investigar intervenções para melhorar a qualidade de sono e a qualidade de vida de forma a existir uma avaliação continuada da saúde mental (Wu et al. 2012). Estas intervenções devem ser desenvolvidas com vista à sua viabilidade, no baixo custo, e com foco na prevenção e promoção da saúde para atender às

demandas de políticas públicas do envelhecimento da população (World Health Organization, 2015).

Estratégias de intervenções focadas na educação em saúde do sono, são relatadas como promissoras, mas ainda não foram replicadas, e há poucos dados sobre a eficácia do uso e da relevância da higiene do sono (Irish et al., 2015). Portanto, permanece a necessidade de investigações que consigam contribuir eficazmente, direta e indiretamente, para o aumento do bem-estar subjetivo, da saúde e da qualidade de vida em idosos.

Refletindo sobre abordagens alternativas para prevenção da depressão e promoção de saúde deparamo-nos com investigações que haviam realizado intervenções com uso de métodos da Psicologia Positiva na redução da depressão e ansiedade, visando o aumento do bem-estar em idosos (Ho et al., 2014; Proyer et al., 2014; Ramírez et al., 2014). Sendo assim, realizámos uma breve revisão de literatura acerca das perspetivas para futuras pesquisas da psicologia positiva em idosos.

Os resultados demonstraram que intervenções que utilizaram a abordagem da Psicologia Positiva são favoráveis à redução dos sintomas (ansiedade e depressão) e ao aumento do bem-estar (Ramínez et al., 2014; Proyer et al., 2014; Ho et al. 2014), como já ressaltado anteriormente. Além disto, os constructos da Psicologia Positiva têm demonstrado resultados com o mesmo impacto no bem-estar e na redução de sintomas (Kobau et al., 2011), retratando uma abordagem promissora para a saúde pública e, também, para futuras idealizações de intervenções.

Entretanto, a necessidade de desenvolver uma nova perspectiva sobre o envelhecimento permanece. E ainda mais, ao levar em conta a promoção da saúde mental e bem-estar. Alguns dos estudos avaliados relataram que é possível conseguir novas perspetivas com a inclusão da Psicologia Positiva. O que nos leva ao próximo artigo desta tese, que dá início à sessão de estudos empíricos e tem como objetivo adaptar o modelo de três fatores da avaliação do Índice de Qualidade do Sono de Pittsburgh versão Portuguesa (PSQI-PT) em idosos.

Este artigo foi desenvolvido a partir da validação que foi realizada, anteriormente, do instrumento PSQI para a população portuguesa (João et al., 2017). Entretanto, como seria interessante tentar obter um alfa de Cronbach's melhor, e outros estudos reportaram anteriormente índices de confiabilidade melhores quando utilizado o instrumento em modelos de dois ou três fatores (Mollayeva et al., 2016). Optou-se por realizar um estudo na tentativa de obter um melhor modelo de avaliação do PSQI-PT (Estudo 3).

Os resultados demonstraram que a confiabilidade melhorou no modelo de três fatores semelhante ao proposto originalmente (Cole et al., 2006), mas sem a componente "uso de medicações para dormir". Propôs-se que esta componente em específico fosse utilizada nesta população como uma avaliação complementar qualitativa de saúde, em vez de incluí-la no modelo. É uma orientação específica para esta população (idosos portugueses) devido a verificação da possibilidade de falso "não" uso de medicação para dormir. Dados demonstram que a população portuguesa tem um elevado consumo de tranquilizantes e antidepressivos (SAÚDE, 2016) e por isso, é de grande importância que se mantenha o rigor para avaliar mais especificamente essa questão do uso de medicação (tipo, frequência, finalidade, etc.) para que não seja um fator a interferir nos resultados do PSQI-PT.

Esta adaptação foi muito importante, e a intenção era que a mesma fosse utilizada nos seguintes artigos empíricos, pois oferece maior especificidade nos resultados da qualidade do sono, i.e. três domínios diferentes de avaliação para a qualidade do sono ao invés de apenas um com o ponto de corte para os que têm boa ou pobre qualidade do sono. O terceiro estudo contribui com a investigação científica do sono instrumentalizando-a para uma avaliação mais detalhada da qualidade do sono em idosos portugueses, através do modelo de três fatores. Entretanto, não foi possível seguir o uso desse modelo específico nesta tese, devido ao tamanho da amostra (n=204) não ser robusta o suficiente para comportar as análises com variáveis latentes através do *software* que tínhamos acesso.

Apesar desta limitação que está diretamente relacionada com a dificuldade em obtenção de uma amostra maior de pessoas com mais de 60 anos "saudáveis" e, apesar de ter conhecimento desta dificuldade antes do início da escrita deste terceiro estudo, optámos por fazê-lo devido ao seu contributo científico. Cientes desta limitação, e desejosos de que futuramente seja possível superá-la, demos seguimento à tese com análises, utilizando apenas as variáveis observadas para realizar os procedimentos estatísticos necessários.

Retomando o objetivo de explorar a qualidade do sono para a prevenção da depressão, surge o quarto estudo desta tese. Procurou-se testar hipóteses de mediação que pudessem explicar como a depressão influencia a qualidade de vida ao considerar os efeitos da qualidade do sono em adultos mais velhos portugueses. De forma geral, os resultados sugerem que é importante estabelecer práticas de autocuidado para intervir no processo de envelhecimento e auxiliar na adaptação às fases posteriores da vida. E, também, considerar a importância que a qualidade do sono tem associada à saúde mental, especificamente com relação aos sintomas de depressão, como relatada em outras investigações (Yu et al., 2016; Zhang et al., 2016).

Visto que existe uma influência na relação depressão – qualidade do sono – qualidade de vida demonstrada neste estudo, e noutros, bem como a bidirecionalidade entre o sono e as emoções (e.g. depressão) (Kahn et al., 2013). Compreendemos, que talvez a intervenção em grupo possa ser uma estratégia a ser aplicada como manutenção e prevenção da saúde. Partindo da ideia de que grupos de intervenção voltados para a qualidade do sono podem ser muito mais bem aceites pelas pessoas que procuram do que os voltados para a temática da depressão em específico.

Com o grupo somos capazes de intervir num maior número de pessoas o que se torna, ao mesmo tempo, numa mais valia para este tipo de intervenção. Também há uma resistência muito menor das pessoas em falar sobre o sono do que sobre a depressão e, a isto pode estar relacionada a questão cultural e pessoal de aceitação do tema. A hipótese que se levanta é que, possivelmente investir em intervenções voltadas para o sono podem surtir efeito sobre a saúde mental dos idosos portugueses e, assim, contribuir para uma melhor qualidade de vida.

Portanto, se a qualidade do sono apresenta influência no efeito da depressão na qualidade de vida, será que o efeito da qualidade do sono na qualidade de vida e na satisfação com a vida pode ser mediado por constructos da Psicologia Positiva (i.e. otimismo, um dos mais investigados e que demonstra impactar a saúde)? Responder a esta pergunta fornece-nos mais ferramentas para traçar o que poderá ser possível desenvolver na intervenção sobre a temática do sono de forma a investir na promoção da saúde mental e bem-estar, prevenindo a depressão.

Sendo assim, deu-se o objetivo do quinto, e último, estudo desta tese: testar hipóteses de mediação que pudessem explicar como a qualidade do sono pode influenciar a qualidade de vida e a satisfação com a vida considerando o efeito do optimismo em adultos mais velhos portugueses. Os resultados demonstraram que o otimismo é um importante mediador, pois exerce a redução no efeito da pobre qualidade do sono, na qualidade de vida e na satisfação com a vida. Essa redução sugere que é preciso investigar e desenvolver programas de intervenção que sejam capazes de promover a boa saúde do sono focando, principalmente, o otimismo para uma melhor satisfação com a vida e qualidade de vida. Assim, confirma-se que este é um importante tópico para investimento nas novas abordagens de intervenção que possam contribuir com o bem-estar em adultos mais velhos.

De modo geral, os resultados do presente trabalho mostraram que a qualidade do sono é um aspecto essencial à saúde, a qual pode ser utilizada como temática de prevenção da saúde mental, bem como promoção de saúde. Apesar de ainda serem necessárias mais investigações a respeito de intervenções a partir de métodos da Psicologia Positiva, poderá ser possível

aproveitar os contributos deste método para a elaboração de um programa de intervenção visando a promoção da saúde do sono em adultos mais velhos.

As principais limitações desta tese foram relacionadas com a participação das pessoas com mais de 60 anos, "saudáveis", na investigação. Este facto limitou o uso das análises de equações estruturais que pudessem explorar melhor o uso do modelo de três fatores adaptado para os idosos portugueses. Através da adaptação do modelo de avaliação do PSQI-PT (estudo 3) foi possível verificar que é importante obter informações mais específicas sobre o uso de medicações para poder compreender/analisar mais adequadamente a avaliação do instrumento da qualidade do sono (PSQI-PT). A mudança de estratégia para obter um maior número de participações na investigação com idosos "saudáveis" é necessária.

Portanto, conclui-se com esta tese que (a) a qualidade do sono é um mediador, reduzindo o efeito da depressão sob a qualidade de vida em idosos portugueses; (b) a prevenção da depressão poderá, possivelmente, ser realizada através de intervenções para melhorar a qualidade do sono em idosos portugueses; (c) o otimismo é um mediador, reduzindo o efeito da pobre qualidade do sono na qualidade de vida, e da pobre qualidade do sono na satisfação com a vida em idosos portugueses; (d) é necessário investigar a intervenção, a nível primário, para promoção da saúde mental através de grupos sobre a temática do sono (e.g., higiene do sono); (e) poderão utilizar-se de técnicas de intervenção com grupos como futuras metodologias de pesquisa para intervenções sobre o sono, pois é uma estratégia de baixo custo que atinge várias pessoas ao mesmo tempo; e, (f) são necessárias mais investigações sobre a saúde do sono e idosos, voltadas para a promoção da qualidade de vida e bem-estar.

Deste modo, esta tese representa um contributo empírico tanto na avaliação do sono em idosos portugueses como no direcionamento de possíveis práticas nesta área. Destaca-se o achado da prevenção da depressão através da abordagem da temática do sono. É um dos principais direcionamentos para uma futura testagem que pode ser utilizado como uma ferramenta capaz de ultrapassar a limitação da resistência de grupos em temáticas de saúde mental. Para além disto, esta tese contribui para achados com população idosa saudável.

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ANEXOS

Original Articles

Depression and sleep quality in older adults: a meta-analysis

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Abstract

The literature emphasizes depression and poor sleep quality as problems that affect many elderly individuals. However, these problems have been related in few studies and there is no meta-analysis performed so far on this relationship. The present research reviewed the studies performed on the subjective sleep quality in order to understand how it relates to depression in older adults. The review was conducted in January 2016 and comprised publications between 2005 and 2015. Based on the electronic databases Web of Science and EBSCO, we used the keywords 'sleep quality', 'depression', and 'older' to identify the empirical studies performed. After assessing the collected studies, we selected those that presented the elderly as participants, resulting in nine papers (N = 3069). A random-effects method was used to evaluate the relationship between depression and sleep. We found that an older person's lack of good sleep quality is significantly related with depression. The main limitation of this study was the difficulty in collecting a greater number of studies. Future research should consider the importance of additional variables (e.g. moderators) in order to understand and investigate viable interventions for prevention and health promotion in the elderly.

Keywords: Ageing, depression, meta-analysis, sleep quality

PERSPECTIVES FROM POSITIVE PSYCHOLOGY IN OLDER ADULTS: BRIEF LITERATURE REVIEW

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ABSTRACT

The present review aims to determine the main findings concerning positive psychology in older adults. We used the electronic databases Web of Science and EBSCO, which were efficient tools to find the necessary heterogeneity for the selection of studies published between 2005 and 2015, through the following keywords: "Positive Psychology" and "Older". After selecting 12 studies, they were assessed regarding the following information: (a) source; (b) setting; (c) number of older adults (participants); (d) average age (SD); (e) inclusion criteria for each study; (f) instruments; and (g) the results of our investigative question. The results show that interventions with a positive psychology approach are favorable to the reduction of symptoms (anxiety and depression) and the increase of well-being; and positive psychology constructs have the same impact on well-being and on reducing symptoms, portraying a promising approach to public health. Our investigation showed the necessity to develop a new perspective on aging. Some of the assessed studies reported that it is possible to achieve this with the inclusion of positive psychology, which can facilitate this development.

Keywords: Older Adults, Elderly, Positive Psychology, Review.

JEL Classification: I31

1. INTRODUCTION

The world's population is aging and the World Health Organization (WHO, 2015) reported that, in the next decades, namely by 2050, the world's population aged over 60 years will have increased from the current 841 million to 2 billion, making the well-being of seniors a new challenge in global public health. In 2020, for the first time in history, the number of people over 60 years old will be higher than that of children up to 5 years old (WHO, 2015). Unfortunately, the increasing number of elderly people has not been accompanied by an increase in public services ready to take care of them (WHO, 2015). A contradiction is apparent in this situation, because higher life expectancy is not directly related to healthy living, since many elderly people are living longer but without quality of life, currently depending on drugs or being kept in specialized institutions. This scenario indicates a public health problem that needs to be solved. The latest world report on ageing and health highlighted the need for a new global framework to cover the wide diversity of older populations and address the inequalities beneath it (WHO, 2015). From a global perspective, the described needs focus on the development of new health care systems in the

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Adaptation of a 3-factor model for the Pittsburgh Sleep Quality Index in Portuguese older adults

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ABSTRACT

The present study examined the factor structure of the Pittsburgh Sleep Quality Index (PSQI) in a sample of older Portuguese adults using a cross-validation approach. Design is a cross-sectional. A convenience sample of 204 community-dwelling older adults (M=70.05, SD=7.15) were included. The global sleep quality (GSQ) score ranged from 0 to 18 with a mean of 5.98 (SD ± 3.45). The distribution showed that gender and perception of oneself as healthy influences GSQ in this sample. Cronbach's α was 0.69, but increased to 0.70 if the "use of sleep medication" component was deleted. Exploratory factor analysis (EFA) demonstrated two factor model is better than one factor, and a model fit with good indices (chi-square=8.649, df=8, p=0.373). Confirmatory factor analysis (CFA) was performed on the single factor, two factor, and three factor models, with and without the "use of sleep medications" component. The best model was the 3-factor model without the "use of sleep medications" component (chi-square=1.214, df=6, GFI=0.997, AGFI=0.918, CFI=0.986, RMSEA=0.046). The adaptation of the model is similar to the original model, with the only change being the exclusion of the "use of medications to sleep" component. We suggest using that component as a complementary qualitative assessment of health.

1. Introduction

Currently, sleep problems constitute a global epidemic that threatens the health and quality of life of approximately 45% of the world's population (Wade et al., 2008; WASM, 2016). Sleep deprivation and poor sleep quality have a high negative impact on health in the short and long term. Poor sleep quality has a negative impact on attention, memory and learning (WASM, 2016). It has also been associated with several serious health problems such as obesity, diabetes, and some cancers (Gottlieb et al., 2005; Gümüştekín et al., 2004; Taheri et al., 2004; WASM, 2016). In addition, many psychological disorders such as depression, anxiety and psychosis are also associated with sleep difficulties (Beusterien et al., 1999; WASM, 2016; Zammit et al., 1999).

Although the majority of sleep disorders are easily prevented or treated, fewer than one-third of those affected seeks professional assistance (WASM, 2016). However, sleep is a basic need of all people, just like eating and drinking, being crucial to ensure good health and quality of life (WASM, 2016). In a comprehensive epidemiological studies, it was found that more than 50% of older adults have insomnia complaints (Foley et al., 1995; Neikrug and Ancoli-Israel, 2010), and sleep improvement was associated with health improvement (Foley et al., 1999; Neikrug and Ancoli-Israel, 2010). However, other studies have also shown that the rates of sleep disorders are lower in healthy older adults (Neikrug and Ancoli-Israel, 2010; Vitiello et al., 2002). So, what changes over the lifespan is not an intrinsic ability to sleep well, but comorbidities related to aging, and not necessarily caused by aging itself (Neikrug and Ancoli-Israel, 2010).

Thus, the ability to identify any difficulties in sleep as soon as possible is essential for the screening of other important comorbidities to act in maintaining good quality of life and well-being of older people. The sleep assessment instrument most commonly used in clinical and research environments is the Pittsburg Sleep Quality Index - PSQI (Mollayeva et al., 2016). It is a self-assessment questionnaire with 19 items that measures sleep disorders through seven components that together make up a Sleep Quality score (Buysse et al., 1989). Several studies have examined the one-dimensionality of the PSQI and raised concerns about the factorial structure of the instrument (Mollayeva et al., 2016). Through a systematic review and meta-analysis it was found that eight out of eleven studies that factor analyzed the PSQI reported that a single factor model poorly fit the resulting data, and the

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