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SLEEP QUALITY AND MENTAL HEALTH

UNIVERSIDADE DO ALGARVE

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SLEEP QUALITY AND MENTAL HEALTH

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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 referências incluídas.

Dedicatória

Aos meus pais pela vida, pelo amor, pela oportunidade.

Ao meu marido, companheiro de mais de 20 anos, pela história partilhada, pelo que aprendemos juntos, pelo pai que é para o meu filho e por todos os nossos sonhos.

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"La voz se me corta cuando emocionada pienso en ti

te viví de tan cerca y nunca te conocí

dejaste en mi tu huella y yo la seguí

en otro puerto nos encontraremos

y te hare sonreír

quiero conocer tu sueño

quiero oírte reír

y que me veas como soy

Te quiero"

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Resumo

O sono é um comportamento essencial à vida e obedece a um complexo processo biológico, psicológico, social e cultural com múltiplas implicações na qualidade de vida dos indivíduos. A qualidade do sono tem vindo a ser investigada de forma exponencial nos últimos 20 anos, quer pela sua importância na saúde física e mental de populações clínicas, quer pela procura de valores normativos em populações não-clínicas. Contudo, apesar do interesse crescente pelas implicações do sono na saúde, as evidências empíricas com populações não-clínicas são quase inexistentes.

A presente investigação teve como objetivos principais analisar o impacto da qualidade do sono na depressão, na ansiedade e no stresse (indicadores de saúde mental) numa amostra não-clínica e, averiguar se a relação entre estas variáveis é moderada pelo género, pela idade e pelo país de origem. Participaram neste estudo um total de 1552 indivíduos de três países distintos (Portugal, Espanha e Brasil). Os participantes responderam a um protocolo de medidas de autorrelato constituído por instrumentos validados que avaliam a qualidade do sono e os indicadores de saúde mental.

Os resultados alcançados confirmaram maioritariamente as hipóteses inicialmente propostas. Constatou-se que a qualidade do sono tem um impacto significativo nos indicadores de saúde mental. Verificou-se ainda que a relação entre a qualidade do sono e os indicadores de saúde mental em estudo (depressão, ansiedade e stresse) é apenas moderada pelo país de origem. De acordo com os principais resultados e conclusões, foram apontadas algumas estratégias de promoção de sensibilização e intervenção precoces na qualidade do sono, desenvolvidas segundo as especificidades da população e/ou indivíduo.

Palavras-chave: Qualidade do sono; Saúde mental; Amostra não-clínica; Género; Idade; País.

Abstract

Sleep is an essential behavior for life and obeys to a complex biological, psychological, social and cultural process with multiple implications in the quality of life of individuals. Sleep quality has been investigated dramatically in the past 20 years because of its role in the physical and mental health of clinical populations, as well as, in the search of more normative values in non-clinical populations. Still, although there has been an increasing interest on the implications of sleep on health, the empirical evidences with non-clinical populations are almost nonexistent.

These investigation´s main objectives were to analyze the impact of sleep quality on the depression, anxiety and stress (mental health indicators) of a non-clinical population, and to evaluate if the relationship between these variables is moderated by gender, age and country of origin. A total of 1552 participants from three different countries (Portugal, Spain and Brazil) answered to a questionnaire with two different validated instruments which measure sleep quality and mental health indicators.

The obtained results confirmed the initially proposed hypothesis. We attested that sleep quality has a significant impact on the mental health indicators. As well, we verified that the relationship between sleep quality and the mental health indicators in study (depression, anxiety and stress) is only moderated by the country of origin. In accordance with our main results and conclusions we outlined some strategies to promote awareness and early interventions on quality of sleep, targeting the specificity of each population/individual.

Keywords: Sleep quality; Mental health; Non-clinical population; Gender; Age; Country

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1. Introdução

O sono é um comportamento complexo, dinâmico e essencial que influencia largamente a qualidade de vida dos indivíduos. Nos últimos 20 anos o interesse clínico, académico e popular na relação entre a qualidade do sono e a saúde física e mental tem crescido exponencialmente (Henry, Knutson, & Orzech, 2013). Diversos estudos epidemiológicos constataram que as perturbações do sono são prevalentes na população geral, embora as percentagens de prevalência nos diversos países variem entre 10% a 50% (Ohayon & Hong, 2002). Estudos mais recentes estimam que cerca de 4 milhões de indivíduos na Europa (Olesen, Gustavsson, Svensson, Wittchen, & Jönsson, 2012) e 50 a 70 milhões nos Estados Unidos da América apresentem perturbações do sono (Altevogt & Colten, 2006). O impacto que estas perturbações têm nos custos sociais, profissionais e económicos (Kyle, Morgan, & Spie, 2010) das diferentes populações afetadas é relevante no momento de decidir políticas de intervenção social e estratégias de tratamento.

Esta realidade observada nos países desenvolvidos, também se verifica nos países em desenvolvimento, como Brasil e Chile, onde os valores de prevalência de perturbações do sono são de 46,7% e 26,3%, respectivamente (Fritsch Montero, Lahsen Martínez, Gómez, Baltra, & Castillo, 2010; Zanuto et al., 2015). Embora os problemas com o sono estejam globalmente disseminados, alguns investigadores sublinham como diferentes países e culturas vivenciam de forma distinta o sono (Airhihenbuwa, Iwelunmor, Ezepue, Williams, & Jean-Louis, 2016; Bin, Marshall & Glozier, 2012; Gildner, Liebert, Kowal, Chatterji, & Snodgrass, 2014; Patel, Grandner, Xie, Branas, & Gooneratne, 2010). Por exemplo, em países como, o Paraguai, o Paquistão e Bali, as famílias partilham o espaço onde dormem, não existem horários de dormir estipulados para as crianças, e as sestas são comuns durante o dia, rotinas muito diferentes da maioria dos países ocidentais.

O estudo das implicações do sono na saúde física e mental de diferentes populações sublinha a importância da prevenção dos problemas de sono na promoção da qualidade de vida. Neste sentido, parece ser cada vez mais pertinente a caracterização de populações não-clínicas com o fim de obter valores normativos (Buysse, 2014; Mollayeva, Thurairajah, Burton, Mollayeva, Shapiro, & Colantonio, 2016).

A relação entre a qualidade do sono e a saúde física está amplamente documentada. Existem evidências empíricas da associação entre os níveis de qualidade do sono e a doença oncológica (e.g., Colagiuri, Christensen, Jensen, Price, Butow, & Zachariae, 2011; Fortner, Stepanski, Wang, Kasprowicz, & Durrence, 2002; Savard & Morin, 2001); a diabetes (e.g., Buxton et al., 2012; Knutson, 2013; Reutrakul & Cauter, 2014); a fibromialgia (e.g., Mungía-Izquierdo & Legaz-Arrese, 2012; Miró, Martínez, Sánchez, Prados, & Medina, 2011); o lúpus eritematoso (e.g., Kasitanon et al., 2013); a obesidade (e.g., Araghi et al., 2013) e a insuficiência cardiovascular (e.g., Knutson, 2013), entre outras.

No mesmo sentido, outros autores concluem existir uma relação entre a qualidade do sono e a doença mental (Baglioni, Spiegelhalder, Lombardo, & Riemann 2010; Baglioni et al., 2014), nomeadamente, as perturbações depressivas e as perturbações da ansiedade (e.g., Fairholme & Manber, 2014), a ansiedade social (e.g., Kushnir, Marom, Mazar, Sadeh, & Hermesh, 2014), a perturbação de pânico (e.g., Hovland et al., 2013) e a esquizofrenia (e.g., Kilicaslan, Esen, Kasal, Ozelci, Boysan, & Gulec, 2017).

A depressão, a ansiedade e o stresse são os indicadores de saúde mental mais prevalentes na actualidade (OMS, 2017). Estas perturbações mentais interferem na qualidade de vida dos indivíduos, nomeadamente, dificuldades cognitivas, detrimento da vida social, absentismo, decréscimo da produtividade e aumento do risco de suicídio (Kessler, Petukhova, Sampson, Zaslavsky, & Wittchen, 2012; Lepine & Briley, 2011), assim como o aumento da frequência de visitas aos centros de saúde e hospitais (Wang, Lane, Olfson, Pincus, Wells, & Kessler, 2005; Wang et al., 2007), e aumento no consumo de medicação (Wang et al., 2007). Estes efeitos implicam custos para o próprio indivíduo e para o estado, que ascendem na Europa a mais de 185 biliões de euros por ano (Olessen et al., 2012).

Face ao exposto, neste trabalho pretendemos analisar o impacto da qualidade do sono na saúde mental (depressão, ansiedade e stresse) numa amostra não-clínica e, testar o efeito moderador da idade, do género e do país na relação entre a qualidade do sono e os indicadores de saúde mental em estudo. A seguir introduzimos sucintamente as variáveis em análise nesta investigação: qualidade do sono, depressão, ansiedade, stresse, género, idade e país de origem.

Uma boa qualidade do sono está associada a uma variedade de fatores positivos, como o bem-estar físico e mental, menor sonolência diurna, mais saúde, e melhor concentração. O conceito "qualidade do sono", embora seja um conceito largamente utilizado, a investigação actual sugere que ainda há muito por averiguar sobre o que define e distingue um "bom sono" de um "mau sono". Harvey, Stinson, Whitaker, Moskovitz, e Virk (2008) analisaram quais os fatores utilizados pelos indivíduos para julgar a qualidade do sono, sendo que os mais utilizados foram "sentir-se descansado ao acordar", "sentir-se recuperado ao acordar" e "sentir-se alerta durante o dia".

A depressão tem sido considerada mundialmente como uma das perturbações mentais mais incapacitantes ao longo do tempo (Ustun, Ayuso-Mateos, Chatterji, Mathers, & Murray, 2004). Este indicador de saúde mental está relacionado com baixa autoestima, falta de motivação e com a perceção de baixa probabilidade de alcançar objectivos de vida que são significativos para o sujeito (Lovibond & Lovibond; Antony, Bieling, Cox, Enns, & Swinson, 1998).

A ansiedade pode ser descrita como um sentimento de medo que se traduz por um estado de tensão ou desconforto, que surge em resposta à antecipação de perigo eminente e cujos principais sintomas são: inquietação, aumento de estado de alerta, tensão motora e aumento da atividade autonómica (APA, 2013).

O stresse pode definir-se como uma resposta interna, que inclui alterações fisiológicas e emocionais, a um estímulo interpretado pelo sujeito como ameaçador e para os quais acredita não ter recursos suficientes para enfrentar (Lazarus & Folkman, 1984). Jesus (2007) afirma que o stresse surge quando ao indivíduo lhe é colocada uma exigência que requer um maior esforço da sua parte para poder superá-la e adaptar-se às novas circunstâncias.

Importa também analisar os vários fatores sociodemográficos associados à qualidade do sono, em estudo neste trabalho, o género, a idade e o país de origem. Na maioria das investigações o género surge como uma variável que influencia a qualidade do sono, apresentando geralmente as mulheres pior qualidade de sono que os homens (e.g., Arber, Bote & Meadows, 2009; Baldwin, Kapur, Holberg, Rosen, & Nieto, 2004; Chen, Kawachi, Subramanian, Acevedo-Garcia, & Lee, 2005; Mellor, Waters, Olaithe, McGowan, & Bucks, 2014). No entanto, alguns autores parecem concluir que estas diferenças de género na avaliação subjectiva do sono devem-se a outras variáveis como os papéis sociais (Chen et al., 2005), o estatuto socioeconómico (Arber et al., 2009) e a idade (Mellor et al., 2014).

Outros autores, referem que o aumento da idade resulta em mais queixas subjectivas sobre a qualidade do sono (Zeitlhofer et al., 2000). Ainda assim, os dados parecem ser ambíguos, visto haver estudos que apontam para uma melhor aceitação das dificuldades com o sono nos indivíduos idosos (Grandner et al., 2012; Kaplan, Hardas, Redline, Zeitzer, & Sleep Heart Health Study Research Group, 2017).

Para além do género e da idade, recentemente tem havido uma corrente que enfatiza o valor da "cultura" no comportamento sono (Henry et al., 2013; Hollan, 2013; Worthman & Brown, 2013). Por cultura entende-se o conjunto de valores, normas e códigos partilhados por um grupo, que moldam as crenças, atitudes e comportamentos desse grupo pela interação dos seus elementos dentro e fora do grupo (Airhihenbuwa, 1999; Airhihenbuwa et al., 2016; Iwelunmor, Newsome, & Airhihenbuwa, 2014). Vários estudos focam características específicas do sono que diferenciam os hábitos de sono em diferentes países e culturas, para mencionar algumas: a duração do sono (Bin et al., 2012), o uso da sesta (Worthman & Brown, 2013); o local onde se dorme (Hollan, 2013; Lohmann, 2013), e dormir em grupo (Hollan, 2013; Lohmann, 2013). Numa sociedade cada vez mais diversificada importa entender até que ponto a "cultura" pode interferir com o modo como cada indivíduo experiencia o seu sono.

Apesar da investigação e do conhecimento sobre a relação entre a qualidade do sono e a saúde física e mental, parecem existir ainda questões por esclarecer, sobretudo no que diz respeito ao impacto da qualidade do sono na saúde mental de populações não-clínicas e ao estudo das variáveis que podem influenciar esta relação. Parece-nos particularmente pertinente aprofundar este tópico em amostras não-clínicas de forma a delinear estratégias de sensibilização e promoção da saúde, e também, intervenções mais específicas, atendendo às características sociodemográficas e psicológicas que influenciam a forma como as populações interpretam a qualidade do sono. O objectivo

final é investir na prevenção e na sensibilização das populações para os benefícios de uma vida saudável, sendo importante analisar esta relação entre a qualidade do sono e a saúde mental em amostras não-clínicas.

Este trabalho será composto por três partes. Na primeira parte e de forma introdutória ao tema em estudo, iremos explanar a complexidade do comportamento sono e as suas implicações na qualidade de vida dos indivíduos. Seguidamente procuraremos definir sumariamente os construtos em análise, nomeadamente, a qualidade do sono, a depressão, a ansiedade e o stresse, dando a conhecer as perspectivas teóricas e os conceitos nos quais baseamos a nossa investigação, assim como os objectivos e as questões de investigação.

Na segunda parte apresentaremos cinco estudos: Estudo 1, "Sleep quality and stress: A literarature review", esta consiste numa revisão sistemática que tem como objectivo principal analisar a evidência científica na relação da qualidade do sono e o stresse; Estudo 2, "Sleep quality, depression and anxiety: A literature review", uma revisão de literatura com o objectivo de investigar a relação entre a qualidade do sono, a depressão e o stresse na literatura científica da actualidade; Estudo 3, "Validation of the Portuguese version of the Pittsburgh Sleep Quality Index (PSQI-PT)", um estudo empírico que pretende validar para a população Portuguesa o questionário Índice de Qualidade de Sono de Pittsburgh; Estudo 4, "The impact of sleep quality on the mental health of a non-clinical population, que consiste num estudo empírico que tem por objectivo avaliar o impacto da qualidade do sono nos indicadores de saúde mental de uma amostra não-clínica, assim como o possível efeito moderador de variáveis sociodemográficas, nomeadamente, género, idade e país, nesta relação; e, por fim, Estudo 5, "Sleep quality components and mental health: Study with a non-clinical population", um estudo empírico com o objectivo de avaliar a especificidade do impacto das componentes do sono nos indicadores de saúde mental e o possível efeito moderador de género, idade e país nesta relação.

Na parte final da tese será apresentada uma conclusão integradora de todo o trabalho. Nesta serão evidenciados os principais resultados encontrados nos cinco estudos, de forma a responder aos objectivos e às questões de investigação definidas, e também, serão apresentadas algumas limitações e sugestões para futuros trabalhos. Esta tese pretende contribuir para o aprofundamento do conhecimento actual sobre o impacto da qualidade do sono na saúde mental, promovendo programas de sensibilização e intervenção precoce na qualidade do sono, desenvolvidos de acordo com as especificidades da população e/ou indivíduo.

A complexidade do comportamento sono

Para entender o papel do sono na vida dos indivíduos é crucial compreendê-lo como um comportamento/processo periódico, biológico, fisiológico, psicológico, antropológico, social, cultural e político, crítico para a manutenção da saúde física e

mental. O sono e o descanso são descritos como estados adaptativos cujas funções principais são a conservação da energia e a regulação do comportamento (Siegel, 2009), contribuindo assim para a recuperação física e mental do corpo. O sono como comportamento biológico é regulado pelo ciclo sono-vigília. Este por sua vez é controlado de forma endógena pelos núcleos supra-quiasmáticos do hipotálamo (i.e., relógios biológicos) (Kalia, 2006). O ciclo sono-vigília surge como uma adaptação do organismo ao ciclo dia-noite, presente desde o início das nossas vidas e é o relógio biológico mais importante para os seres humanos. Assim, do ponto de vista biológico, o sono é entendido como um comportamento dinâmico regulado pelo cérebro e controlado por diferentes sistemas neuroquímicos interconectados entre si.

No entanto, as oscilações entre o sono e a vigília variam também conforme as oscilações rítmicas do ambiente (e.g., horário de trabalho vs. lazer) (Neto & Castro, 2008). Na procura de um melhor sono, a população é aconselhada a alterar a sua higiene de sono antes de dormir (e.g., som, temperatura, luminosidade) na tentativa de modificar o ambiente e encontrar o enquadramento óptimo para um bom sono. Constata-se que as condições sociais em que se nasce, vive e trabalha têm implicações no sono. Segundo Williams (2013), investigador do sono e dos factores sociais do sono, quando, onde e como as pessoas dormem são questões sociais importantes que influenciarão a sua qualidade do sono. Desde uma abordagem sociológica é importante entender as forças sociais que governam o sono, assim como, o que antecede e precede o sono. Schwartz (1970) descreve o sono como "a forma mais radical de retirada institucionalizada" e sugere que as próprias organizações deveriam tentar protegê-lo pela importância que tem para o indivíduo e para o seu papel no meio social.

Numa perspectiva cultural e antropológica, as especificidades culturais das populações ditam hábitos e crenças que caracterizam e influenciam o seu sono, e que por sua vez têm impacto na saúde. Horários para dormir, duração do sono, espaço onde se dorme, com quem se dorme, entre outras, representam características distintas do comportamento sono que diferenciam indivíduos e comunidades. Vários estudos etnográficos de padrões de sono em sociedades não Ocidentais (e.g., Botswana, Paraguai, Nova Guine, Austrália, Indonésia, República Democrática do Congo, Paquistão, Quénia e Bali) têm revelado que os comportamentos à volta do sono são bem distintos dos adotados pelas sociedades ditas desenvolvidas (Henry et al., 2013). Nestas sociedades "menos desenvolvidas" todo o ritual do sono é encarado de forma distinta, não só no que diz respeito ao significado que lhe é conotado mas também como se dorme. Dorme-se maioritariamente em grupo, os horários para dormir são fluidos e as sestas são comuns, dormem com o barulho das pessoas e dos animais, em espaços escuros e com poucas ou sem barreiras físicas e acústicas às condições ambientais (Hollan, 2013; Lohmann, 2013; Musharbash, 2013; Worthman & Melby, 2002). Surge assim o sono como comportamento evolutivo. Para além da arquitectura do sono se alterar, modificando-se intensamente desde a infância até à velhice, também segundo alguns autores, como dormimos na actualidade é distinto de como dormíamos há séculos atrás (Boerger & Koinis–Mitchell, 2010; Glaskin & Chenhall, 2013).

Desde uma abordagem política Williams (2011) afirma que o papel desempenhado por políticos e consumidores influenciam as políticas de saúde podendo afectar o sono das populações. As intervenções farmacológicas e técnicas para melhorar e "uniformizar" os hábitos de sono têm-se difundido pelas populações fazendo da medicina do sono uma indústria multimilionária (Airhihenbuwa et al., 2016). É de esperar que as políticas implementadas pelos governos tenham em conta o conhecimento actual sobre a importância do sono na vida dos indivíduos e da sociedade.

Esta concepção inclusiva e evolutiva do sono permite-nos abordar as suas funções de forma mais abrangente reflectindo melhor sobre o sono e o seu papel na humanidade. Para o entendimento das suas funções importa também compreender a fisiologia do sono. O sono caracteriza-se por uma alteração reversível do estado de consciência e da reactividade a estímulos ambientais, características estas que podem ser avaliadas através de três variáveis fisiológicas que incluem: o electroencefalograma (EEG), para medição das ondas cerebrais; o electro-oculograma (EOG), para documentar os movimentos oculares; e o eletromiograma submentoniano (EMG), para medição da actividade eléctrica das membranas excitáveis das células musculares (Fernandes, 2006).

Todas estas variáveis são analisadas no chamado estudo de polissonografia que permite o estudo objectivo dos parâmetros do sono. Estas variáveis permitem distinguir o sono em dois padrões fundamentais: o sono sem movimentos oculares rápidos, ou sono lento (NREM) e o sono com movimentos oculares rápidos, ou sono paradoxal (REM). Entre os dois, produzem-se cinco estágios distintos de sono. Durante estes estágios além de mudanças em diversas outras variáveis fisiológicas, como o tónus muscular e o padrão cardio-respiratório, verifica-se por EEG a existência do aumento progressivo de ondas lentas na evolução do sono do estágio I ao estágio IV do sono NREM, e o predomínio de ritmos rápidos e de baixa voltagem no sono REM (Fernandes, 2006). Portanto, pode distinguir-se se estamos acordados, a dormir ou a sonhar através de três estados cerebrais objectivamente identificáveis: vigília, sono paradoxal (REM) e sono lento (NREM).

Durante o sono de ondas lentas (NREM) ocorre a recuperação da fadiga corporal, e a restauração e produção de anticorpos e hormonas, como a hormona do crescimento e a testosterona (Fernandes, 2006). Segundo Brunschwig (2008) também ocorrem a renovação de células, a cicatrização de tecidos e órgãos e a síntese de proteínas. Funções cognitivas como a memória e a aprendizagem estão associadas tanto ao sono NREM como ao REM. Enquanto as memórias não declarativas como as habilidades senso-motoras e os hábitos são muitas vezes melhoradas após um período de sono REM, as memórias declarativas, como a memória consciente de eventos e lugares estão associadas à diminuição do esquecimento após um período de recodificação do sono não REM (Mednick, Cai, Shuman, Anagnostaras, & Wixted, 2011). Igualmente, o sono REM é responsável pela recuperação psíquica, e durante a gestação tem um papel na construção do cérebro da criança (Brunschwig, 2008).

Uma das teorias mais analisadas sobre as funções cognitivas do sono é a teoria da consolidação das memórias (Marr, 1970; Marshall, Helgadottir, Molle, & Born, 2006; Feld & Born, 2017). Esta teoria pressupõe que o sono contribui para a formação de memórias através da consolidação de nova informação e da sua integração com conteúdos previamente armazenados (Marr, 1970). Enquanto a codificação de novas memórias ocorre principalmente durante a vigília, mais especificamente durante o comportamento exploratório, esta teoria pressupõe que a segunda fase da formação das memórias, a "consolidação" se processa predominantemente durante o sono. Axmacher, Elger e Fell, (2009) sugerem que estas memórias previamente codificadas durante o sono se propagam nas áreas neo-corticais do cérebro levando ao armazenamento da informação a longo prazo, daí o papel do sono na capacidade de aprendizagem.

Também, no que se refere à importância do sono nos processos emocionais, há autores que enfatizam como o défice significativo de sono prejudica a auto-regulação das emoções (Harvey, 2011; Goldstein & Walker, 2014; Ochsner & Gross, 2014; Reddy, Palmer, Jackson, Farris, & Alfano, 2017). Para Walker e Helm, (2009) durante o sono ocorre a modulação nocturna de sistemas neuronais afectivos e o reprocessamento de experiências emocionais recentes, ambos responsáveis pela reactivação diurna dos centros de processamento límbicos e autonómicos. Ao nível neurobiológico a regulação das emoções depende da interação entre estruturas subcorticais do cérebro no sistema límbico (por ex., amígdala) responsável pelas respostas emocionais aos estímulos com centros de controlo (ex. córtex pré-frontal) que regulam as respostas emocionais e o comportamento (Ochsner & Gross, 2014). Sendo que estas estruturas e os neurotransmissores envolvidos na regulação das emoções também regulam o sono (Goldstein & Walker, 2014), e grande parte das perturbações emocionais coocorrem com complicações do sono (Harvey, 2011; Reddy et al., 2017) poderíamos afirmar que a forma como reagimos emocionalmente a acontecimentos diurnos também dependerá de como "dormimos" na noite anterior.

Sendo irrefutável o impacto do sono no comportamento dos indivíduos, é impreterível o investimento científico numa melhor avaliação e compreensão deste fenómeno. Ao longo das últimas décadas têm sido desenvolvidos vários questionários de autorrelato com o objectivo de facilitar a tarefa de diagnóstico aos clínicos, permitindo um acesso mais rápido e menos dispendioso à saúde do sono dos indivíduos.

Na verdade, tanto a avaliação subjectiva como a objectiva apresentam mais-valias e limitações. Por exemplo, embora a polissonografia permita obter dados objectivos sobre a qualidade do sono dos indivíduos, impõe custos elevados e um grande esforço por parte dos investigadores (Bertalozi et al, 2011), para além da leitura dos resultados também apresentar a subjectividade da interpretação do técnico. Técnicas como a polissonografia e a actigrafia de pulso quantificam componentes fisiológicas (Hita-Contreras, Martínez-López, Latorre-Román, Garrido, Santos, & Martínez-Amat 2014), como a actividade electroencefalográfica, a função respiratória, cardiovascular, muscular, os movimentos oculares, e os movimentos do pulso (Marino et al., 2013). Ainda que os dados obtidos sejam confiáveis, reportam apenas uma pequena fracção da

actividade do cérebro durante o sono, sendo pouco esclarecedoras sobre a correlação entre a actividade cerebral e os sintomas diurnos relacionados com as dificuldades com o sono (Moul, Hall, Pilkonis, & Buysse, 2004). Perante estes factos não podemos considerar estas medidas objectivas, como absolutas.

Na tentativa de ultrapassar algumas das limitações da avaliação objectiva os investigadores interessados no estudo do sono desenvolveram instrumentos de autorrelato que permitem uma aplicação mais rápida e simples. A utilização de medidas de autoavaliação, tanto na investigação, como na clínica vem facilitar o conhecimento do sono como fenómeno complexo e individual (Buysse, Germain, & Moul, 2005). Mais ainda, a investigação tem demonstrado que a avaliação objectiva (traços biológicos), nem sempre aborda sintomas psicológicos que podem ser avaliados por medidas subjectivas, como os questionários de autorresposta (Hawkley, Lavelle, Berntson, & Cacioppo, 2011). Estas medidas subjectivas são mais acessíveis economicamente, de administração relativamente rápida, incidem sobre distintos aspectos do sono e permitem a obtenção de dados que facilitam a comparação entre amostras.

Numa revisão sistemática com 32 estudos, João, Becker e de Jesus (2016) procuram conhecer a relação entre a qualidade do sono, a depressão e a ansiedade, tendo como critério de inclusão a utilização do Pittsburgh Sleep Quality Index (PSQI) (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989) para avaliação subjectiva do sono. Os autores constataram que o questionário mais utilizado para além do PSQI, foi o Epworth Sleepness Scale (ESS) (Johns, 1991), seguido do Insomnia Severity Index (ISI) (Bastien, Vallières, & Morin, 2001). Num outro estudo cujo objectivo foi caracterizar e comparar os valores do PSQI e do ESS numa amostra não-clínica, constatou-se que estes questionários medem dimensões ortogonais dos sintomas sono-vigília mas nenhum deles se relaciona com as medidas e avaliação objectiva do sono (Buysse et al., 2008). Mais ainda, concluíram que o PSQI comparado com o ESS está mais relacionado com os valores dos sintomas psicológicos e as mediadas dos diários de sono. Foi devido às suas características psicométricas e à sua ampla utilização em populações diversificadas, clínicas e não-clínicas e à sua estreita e comprovada ligação aos sintomas psicológicos que se optou pelo uso do PSQI neste trabalho.

O PSQI é uma escala constituída por 19 itens distintos de auto-resposta e 5 itens a ser respondidos pelo parceiro de quarto ou de cama, sendo que estes últimos têm apenas interesse clínico e não são cotados. Inicialmente foi criada para diferenciar entre grupos com “bom” e “pobre” sono em populações clínicas (Buysse et al., 1989). Estes itens permitem analisar os distintos fatores da qualidade do sono que se agrupam para formar sete componentes: qualidade do sono, latência do sono, duração do sono, eficiência do sono, distúrbios do sono, uso de medicação para dormir e disfunção diurna. A cada um dos componentes é atribuída uma pontuação que oscila entre zero (0) a três (3) pontos. Uma pontuação de 0 pontos indica que não existe dificuldade, enquanto uma pontuação de 3 indica uma dificuldade severa. Os sete componentes somam-se para obter uma pontuação global, que oscila entre zero (não existe

dificuldade) e 21 (dificuldades severas em todas as áreas estudadas), sendo que o autor da escala propõe um ponto de corte quando se atinge a pontuação cinco (5). Uma pontuação igual ou superior a cinco, indica dificuldades moderadas em pelo menos três áreas do sono ou dificuldade severa em duas. Em índices iguais ou superiores a cinco encontram-se os sujeitos com pouca qualidade de sono, o que indica dificuldades moderadas em pelo menos três áreas do sono ou dificuldade severa em duas. Como instrumento auto-administrado, o questionário da qualidade de sono de Pittsburgh oferece uma medida "padronizada" e quantitativa da qualidade de sono, que rapidamente identifica quem tem ou não problemas de sono mas não proporciona um diagnóstico, embora oriente o investigador ou clínico para as áreas do sono mais deterioradas (Buysse et al., 1989).

Este questionário de autorelato é de fácil e rápida administração e está traduzido em 48 idiomas. Tem sido amplamente utilizado em vários países e culturas, tais como; Portugal (João, Becker, Jesus, & Martins, 2017), Espanha (Hita-Contreras et al., 2014), Japão (Doi et al., 2000), China e Hong Kong (Wong & Fielding, 2011), Nigeria (Aloba, Adewuya, Ola, & Mapayi, 2007), EUA (Lund, Reider, Whiting, & Prichard, 2010), e Brasil (Bertolazi et al., 2011). As suas propriedades psicométricas têm sido analisadas em variadíssimos estudos: consistência interna (Beaudreau et al., 2012), teste re-teste fiabilidade (Backhauss, Junghanns, Broocks, Riemann, & Hohagen, 2002), validade (Bertolazi et al, 2011; Buysse et al., 2008; Carpenter & Andrykwosqui, 1998; Curcio et al, 2013; Hita-Contreras et al., 2014; João et al, 2017; Nishiyama et al., 2014) e estrutura factorial (Becker & de Neves Jesus, 2017; Burkhalter, Sereika, Engberg, Swirz-Justice, Steiger, & De Geest, 2010; Cole, Motivala, Buysse, Oxman, Levin, & Irwin, 2006; Mariman, Vogelaers, Hanoulle, Delesie, Tobback, & Pevernagie, 2012). Também tem servido para a avaliação subjectiva do sono de populações clínicas (Batzmaz, Sarıyıdız, Göçmez, Bozkurt, Yıldız, & Çevik 2014; Colagiuri et al., 2011; Hovland et al., 2013; Palagini et al., 2014; Romito et al., 2014) e não clínicas (Anders, Breckenkamp, Blettner, Schlehofer, & Berg-Beckhoff 2013; Carvalho Aguiar Melo, das Chagas Medeiros, Meireles Sales de Bruin, Pinheiro Santana, Bastos Lima, & De Francesco Daher, 2016; Hinz et al., 2017; Kalmback, Pillai, Roth, & Drake, 2014; Mellor et al., 2014) permitindo a obtenção de dados fiáveis para um melhor entendimento da realidade do sono em contextos diversos.

É ainda relevante salientar, que embora os resultados obtidos com o PSQI não tenham capacidade de diagnóstico, permitem direccionar o clínico para as componentes do sono mais afectadas, por esta razão esta medida parece ser importante para os clínicos nos cuidados de saúde primários. O acesso a este questionário e outros semelhantes poderá permitir o reconhecimento precoce das componentes do sono afectadas, aumentanto a viabilidade de intervenções bem-sucedidas. Um conhecimento mais abrangente da prevalência dos problemas do sono e das suas especificidades facilita o trabalho dos clínicos diminuindo a possibilidade do subdiagnóstico e aumentando a probabilidade de diagnósticos atempados.

Actualmente, duas das grandes compilações e classificações das perturbações do sono, são, a Classificação Internacional de Distúrbios do Sono (ICSD 3) elaborada pela American Academy of Sleep Medicine (2014) e destinada aos profissionais da medicina do sono, e o Manual de Diagnóstico de Saúde Mental (DSM 5) editado pela American Psychiatric Association (APA, 2013), para utilização dos clínicos de saúde mental e clínicos gerais. Em 2014 na Classificação Internacional de Perturbações do Sono, 3.ª edição, já constavam mais de 70 entradas (AASM, 2014). Também no DSM 5 (2013) a classificação das perturbações do sono sofreu algumas alterações de forma a adequar-se à evidência científica epidemiológica, genética e fisiopatológica. De acordo com os valores de prevalência apresentados na última edição do DSM (APA, 2013), as perturbações do sono mais frequentes são a insónia (como a mais prevalente), a síndrome das pernas inquietas, a apneia do sono e a perturbação do ritmo circadiano do sono, tipo trabalho por turnos.

A insónia é definida no DSM 5 (2013) pela dificuldade em iniciar/manter o sono, acompanhada pelo decréscimo do funcionamento diurno, que persiste durante pelo menos quatro semanas. Um terço dos adultos relata insónia, 10 a 15% experimentam detrimento nas actividades diurnas, e 6 a 10% apresentam sintomas que atendem aos critérios a perturbação de insónia (APA, 2013).

No que se refere à síndrome das pernas inquietas esta é caracterizada pelo desejo de mover os membros associado com parestesias das pernas, inquietude motora, intensificação dos sintomas em descanso com alívio pela actividade, e agravamento dos sintomas durante o entardecer e a noite (APA, 2013). A incidência desta síndrome aumenta com a idade (Ondo, 2009) e a sua prevalência é cerca do dobro nas mulheres em relação aos homens (Leschziner & Gringras, 2012). Segundo Ohayon, O'Hara e Vitiello (2012) a estimativa da prevalência desta síndrome varia entre 1,9% a 15%, dependendo dos critérios de investigação.

A apneia do sono é a mais comum das perturbações graves do sono relacionadas com a respiração e caracteriza-se pela recorrência de episódios de obstrução parcial (hipopneia) ou total (apneia) da via área superior (faringe) durante o sono (Punjabi, 2008). A prevalência da apneia obstrutiva do sono, de moderada a severa, é de 6% a 17%, podendo ir até aos 49% nos idosos (Senaratna, et al., 2016). É considerada como um factor de risco independente para distúrbios cardiovasculares, metabólicos e psiquiátricos tais como hipertensão, enfartes, diabetes e depressão (Arnardottir, Bjornsdottir, Olafsdottir, Benediktsdottir, & Gislason, 2015; Mirrakhimov, Sooronbaev, & Mirrakhimov, 2013; Park, Ramar, & Olson, 2011).

Os dois principais sintomas da perturbação do ritmo circadiano do sono, tipo trabalho por turnos, são a insónia e a sonolência excessiva. Segundo o DSM 5 (2013), 5% a 10% da população dos trabalhadores nocturnos (16% a 20% da força de trabalho) podem ser afectados por esta perturbação. Devido à sintomatologia associada a esta perturbação, os trabalhadores noturnos estão em risco significativo de morbidade relacionada com o comportamento e a saúde (Arkerstedt, 2003; Song, Choi, & Joo,

2016). Nestes aumenta significativamente o risco de acidentes de viação, e a probabilidade de acidentes no trabalho acresce em 60%. (Rajaratman, Howard, & Grunstein, 2013).

Como referimos anterirormente, estas perturbações têm implicações significativas no bem-estar e na qualidade de vida dos indivíduos que podem pôr em causa a sua vida pessoal, social, familiar e laboral. A sua prevalência é globalmente considerável ultrapassando barreiras geográficas e culturais. A National Sleep Foundation num inquérito realizado nos EUA em 2014 com o objectivo de avaliar a qualidade do sono e a prevalência de perturbações do sono na população norte americana, verificou que 35% dos americanos reportavam dormir mal ou apenas razoavelmente. Neste inquérito, 17% dos inqueridos tinham sido diagnosticados por um médico como tendo um problema de sono, 11.6% da amostra um diagnóstico de apneia do sono; 40% dos inquiridos indicaram roncar algumas noites por semana, assim como os indivíduos com sintomas de insónia tinham uma maior probabilidade de roncar (NSF, 2014). Léger, Poursain, Neubauer e Uchiyama, (2008) num inquérito internacional com 10.132 indivíduos com mais de 5 anos, obtiveram dados semelhantes, constataram que a prevalência dos problemas de sono era de 56% nos EUA, 31% na Europa Ocidental (França, Alemanha, Italia, Espanha e Reino Unido) e 23% no Japão.

A incidência de problemas com o sono em países da América Latina, como por exemplo o Brasil, também é elevada. Num estudo que envolveu 132 cidades brasileiras, 76% dos participantes relatou sofrer de pelo menos uma queixa de sono (Hirotsu, Bittencourt, Garbuio, Andersen, & Tufik, 2014). A realidade portuguesa não é muito diferente da constatada em outros países. Em Portugal mais de 28% da população, com mais de 17 anos, apresenta sintomas de insónia pelo menos 3 noites por semana (Ohayon & Paiva, 2005).

As perturbações do sono afectam a qualidade de vida, prejudicam a produtividade profissional e aumentam o risco de acidentes e de custos com a saúde e o apoio social (Kyle et al., 2010), e ainda aumentam o risco de mortalidade (Buysse et al., 2005). Na Europa em 2010, o custo total anual das perturbações do sono ascendeu a 35,5 biliões de euros (Olesen et al., 2012). Com base em dados do Institute of Medicine (IOM), nos EUA centenas de milhões de dólares por ano são gastos em custos médicos diretamente relacionados com as perturbações do sono (Reis, Mestre, Tecedeiro, & Paiva, 2014).

Desta forma verifica-se que esta é uma realidade verdadeiramente inquietante mais ainda porque, segundo Ohayon e Hong (2002) a maior parte dos indivíduos afectados por estas perturbações não procuram ajuda médica, outros apenas relatam estes sintomas no decorrer de consultas devido a outros problemas de saúde, e em menor número são os que procuram ajuda específica para estes sintomas. Léger e Poursain (2005), elaboraram um estudo no qual concluíram que quase três quartos da população geral com insónia, não recebe ajuda médica para esta perturbação.

Outros autores têm investigado o consumo de medicamentos na problemática do sono, constatando que a maior parte da população com problemas consome medicação sem receita médica, muitos optam por consumir álcool e em menor percentagem surgem aqueles que consomem medicação com prescrição (Morin, LeBlanc, Daley, Gregoire, & Merette, 2006; Ohayon, 2001). É importante a sensibilização dos médicos de cuidados primários para a realidade das perturbações do sono de forma a poderem reconhecer os sintomas e actuar precocemente em conformidade com as necessidades dos utentes.

Tendo em consideração a complexidade do comportamento sono e toda a sua abrangência em termos de impacto na saúde física e mental dos indivíduos, é espectável que a investigação, os meios de comunicação, as políticas de saúde e a indústria farmacêutica, cada vez mais se foquem no sono e na sua qualidade, ou na falta dela.

A qualidade do sono

De forma a poder definir a "qualidade do sono", como variável de interesse para a nossa investigação, procuramos entendê-la à luz da evidência científica. Nesse sentido verificou-se a existência de estudos que pretendem comparar dados da avaliação subjectiva e objectiva do sono, na procura de correlações que permitam compreender a "qualidade do sono". Globalmente os estudos parecem concluir que as correlações entre a avaliação subjectiva da qualidade do sono e os parâmetros objectivos do sono são pobres (Backhaus et al., 2002; Buysse et al., 1989; Buysse et al., 2008; Edinger et al, 2000; Grandner et al., 2006).

Ainda, na investigação sobre a qualidade do sono e as suas correlações, outros estudos têm sugerido a relação entre a qualidade do sono e a percepção subjectiva de parâmetros do sono, tais como; facilidade em deixar-se dormir e acordar cedo (Kecklund, Akerstedt, & Axelsson, 2003), manutenção do sono e duração total do sono (Bastien et al., 2003), e, movimentos durante o sono, ansiedade, tensão ou calma enquanto adormece (Webb, Bonnet, & White, 1976). Outros autores investigaram a correlação entre a qualidade do sono e como o indivíduo se sente imediatamente após o acordar. Alguns dos parâmetros do sono sugeridos foram; sentir-se descansado, restabelecido, revigorado, e número de despertares durante a noite (Harvey et al., 2008), e, humor e sensações físicas ao acordar (Webb et al., 1976). Igualmente e mais recentemente, a National Sleep Foundation, apresentou os factores mais associados à qualidade do sono, a mencionar; latência do sono diminuída, despertares nocturnos, acordar depois de iniciar o sono e eficiência do sono (Ohayon et al, 2017).

Rente e Pimentel (2004) definem o sono normal, isto é, um sono com qualidade, como: *"aquele que proporciona ao sujeito uma sensação de bem-estar, de descanso físico e mental, de noite "bem-dormida", com recuperação de energias, permitindo-lhe executar em boas condições físicas e mentais as tarefas do dia seguinte".* Embora ainda haja muito por investigar para podermos definir sem hesitação o que é o sono com qualidade, na verdade esta definição poderia ir ao encontro daquilo que muitos

explicariam como uma noite "bem dormida". A associação entre uma noite "mal dormida" e um dia "perturbado" é de senso comum, quantos já não associaram os malefícios de um sono pobre à irritabilidade, falta de concentração e mau humor no dia seguinte. Assim, o sono é interpretado pelos indivíduos como um comportamento que influencia a qualidade de vida. Referimo-nos à qualidade de vida como a percepção individual que cada indivíduo tem da sua vida, considerando a saúde física, mental, social e funcional (Post, 2014). Pela sua importância na qualidade de vida, vários estudos têm documentado amplamente esta relação entre a qualidade do sono e a saúde física e mental (Becker, de Jesus, Marguilho, Viseu, João, & Buela-Casal, 2015; João et al., 2016; João et al., 2017; João, de Jesus, Carmo, & Pinto, 2018; Moyalleva et al., 2016).

De acordo com a Organização Mundial da Saúde (OMS, 2017) as perturbações mentais mais prevalentes são a depressão, a ansiedade e o stresse. Importa assim reflectir sobre a relação da qualidade do sono e estes indicadores de saúde mental também em estudo no presente trabalho de investigação.

Alguns autores têm constatado que 50 a 90% dos sujeitos diagnosticados com depressão apresentam queixas na qualidade do sono (Hetta, Rimon, & Almqvist, 1985; Riemann, Berger, & Voderholzer, 2001; Riemann, 2014). Mais especificamente, parece existir uma forte associação entre a insónia e a depressão major (Tsuno, Besset, Ritchie, 2005; Moos, 1999). A insónia tem sido considerada como um factor de risco não só na manutenção da depressão mas também no seu desenvolvimento (Breslau, Roth, Rosenthal, & Andreski, 1996; Chang, Ford, Mead, Cooper-Patrick, & Klag, 1997; Ford & Kamerow, 1989; Roberts, Shema, Kaplan, & Strawbridge,2000).

A qualidade do sono é ainda associada às perturbações da ansiedade (Papadimitriou & Linkowski, 2005; Mellman, 2006). A National Comorbidity Survey Replication identificou que a taxa de prevalência de comorbidade entre as perturbações do sono e da ansiedade é de 32,5% (Roth, Jaeger, Jin, Kalsekar, Stang, & Kessler, 2006). No mesmo sentido, outros estudos têm salientado a importância da análise da relação entre a qualidade do sono e o stresse (Cho et al., 2013; Gamaldo et al., 2014; Kashani, Eliasson, & Vernalis, 2012; Ko, Chang, & Chen, 2010; Okun, Tolge, & Hall, 2014). As estruturas cerebrais envolvidas no ciclo do sono são moduladas pelo equilíbrio entre sistemas neuronais inibidores e o circuito neuronal excitatório (Ferini, Galbiati & Marelli, 2013), e estes por sua vez, são influenciados pela insónia e pelo stresse. Mais recentemente outros estudos que utilizaram o PSQI para avaliar a qualidade do sono, verificaram que a Qualidade Global do Sono em populações não-clinicas está relacionada com a depressão, a ansiedade (Hsieh Li, Chang, Lai, Wang, & Wang, 2011; João et al., 2018; Kalmback et al., 2014; Plumb et al., 2014;) e o stresse (Almojali, Almalki, Alothman, Masuadi, & Alaqeel, 2017; João et al., 2018; Mellor et al., 2014).

Na revisão de literatura efetuada é possível concluir que a relação entre a qualidade do sono e a saúde mental em populações não-clínicas parece ser moderada

por vários factores sociodemográficos como o género, a idade, a educação, o estatuto socioeconómico, entre outros. São vários os estudos que têm destacado a influência do género na qualidade do sono (Arber et al., 2009; Chen et al., 2005; Mellor et al., 2014), destacando-se as mulheres como o grupo que apresenta maiores dificuldades no sono. No entanto, estas diferenças de género na qualidade subjectiva do sono podem dever-se a outros factores sociodemográficos, como o estatuto socioeconómico (Arber et al., 2009), os papéis sociais (Chen et al., 2005) e a idade (Mellor et al., 2014).

Estas discrepâncias entre géneros poderiam dever-se também ao facto de mais mulheres apresentarem sintomas de depressão e ansiedade, e estas perturbações mentais implicarem uma maior probabilidade de ter um sono comprometido (Piccinelli & Wilkinson, 2000; Ustun et al., 2004). Todavia, mesmo depois de controlar os efeitos dos valores elevados de morbilidade psiquiátrica estas diferenças mantêm-se (Lindberg Janson, Gislason, Björnsson, Hetta, & Boman,1997; Zhang & Wing, 2006). Outra das razões apontada para esta desigualdade refere-se aos diferentes mecanismos biológicos que caracterizam homens e mulheres. Johnson, Roth e Breslau (2006) afirmam que o risco de insónia nas mulheres inicia-se com o começo da menstruação, assim, enquanto durante o período pré-menopausa se verifica nas mulheres uma prevalência de 33 a 36% de insónia, no período pós-menopausa regista-se um aumento para 43 a 61% (Krishnan & Collop, 2006). Segundo Joffe, Massler e Sharkey (2010) este aumento pode dever-se à presença de sintomas vasomotores, alterações hormonais, mudanças no sono relacionadas com a idade, comorbidades e fatores psicossociais.

Outros autores tentam desvalorizar as possíveis explicações biológicas e psicológicas para esta diferença de género na qualidade do sono, e reivindicam a influência de papéis sociais e caraterísticas socioeconómicas nesta realidade. Chen et al. (2005) num estudo representativo da população de Taiwan, com 39588 participantes, com mais de 15 anos, verificaram que as discrepâncias de género na qualidade de sono, com as mulheres a apresentar pior qualidade de sono que os homens, diminuíam ligeiramente depois de tomar em consideração os papéis sociais. Esta abordagem tem em conta que as mulheres têm responsabilidades distintas na organização do lar, nas horas de trabalho e na duração do sono.

As mulheres ainda vivem a desigualdade de condições laborais, daí haver estudos que sugerem como o estatuto socioeconómico influência o seu sono. Arber et al. (2009) analisaram a qualidade do sono numa amostra não-clínica de 8580 participantes com idades compreendidas entre os 16 e os 74 anos e observaram que as mulheres apresentavam significativamente pior qualidade de sono que os homens. Esta diferença reduzia para metade quando se controlavam as características socioeconómicas. Os mesmos autores sugeriram que as diferenças nos papéis socias, familiares e laborais das mulheres influenciam a sua qualidade de sono (Arber et al., 2009). Na verdade, as mulheres em algumas sociedades poderão ter menos oportunidades de acesso a uma educação adequada, o que subsequentemente as impedirá de ter um melhor emprego. Todavia, verifica-se nos países desenvolvidos uma tendência para a normalização das

oportunidades entre homens e mulheres, dependendo das sociedades e da cultura estas diferenças poderão ou não evidenciar-se (João et al., 2018).

Outro dos factores sociodemográficos amplamente analisado no que concerne ao estudo da relação entre o sono e a saúde mental, é a idade, apesar das evidências científicas serem contraditórias. Alguns autores confirmam que com o aumento da idade aumentam as queixas sobre o sono. Zeitlhofer et al. (2000) numa amostra não-clínica de 1049 indivíduos com mais de 15 anos, verificaram através do PSQI que a qualidade do sono diminuía com a idade, sobretudo nas mulheres. No entanto, outros estudos sugerem que os idosos têm menor probabilidade de declarar problemas de sono do que os jovens adultos (Grandner et al., 2012) e os adultos de meia-idade (Kaplan et al., 2017).

É importante salientar que quando avaliada objectivamente (e.g., polissonografia), a qualidade do sono dos idosos é inferior a quando avaliada subjectivamente (Maglione et al., 2012). O facto dos idosos já não terem determinado tipo de responsabilidades socias, familiares e sobretudo ocupacionais, poderá explicar que embora a avaliação objectiva registe pior qualidade do sono, na verdade estes avaliem subjectivamente o seu sono de forma mais positiva que os outros adultos. Este facto poderá indicar que os idosos são mais tolerantes em relação à qualidade do seu sono. Da mesma forma, a complexidade e a estrutura multifactorial do construto "sono" poderá justificar esta divergência entre a avaliação objectiva e subjectiva do mesmo (Mollayeva et al., 2016).

Por outro lado, há autores para quem a congruência entre a avaliação objetiva e subjetiva depende do funcionamento cognitivo dos indivíduos (Papagno, Allegra & Cardaci, 2004), e/ou do diagnóstico de doenças crónicas, como a síndrome de fadiga (Watson et al., 2003), doença de Parkinson (Happe et al., 2005), fibrose cística (Jankelowitz, Reid, Wolfe, Cullina, Zee, & Jain, 2005), e fibromialgia (Landis, Frey, Lentz, Rothermel, Buchwald, & Shaver, 2003). Também de referir a importância da influência da depressão na forma como o idoso poderá avaliar subjectivamente o seu sono. Assim, os mais saudáveis terão a tendência a interpretar o seu sono como de melhor qualidade, do que aqueles que sofrem de outras condições físicas e/ou mentais. Sendo que o aumento de idade para os idosos vem acompanhado de uma maior probabilidade de doença crónica (Weiss, 2011), limitações cognitivas (Ardila, 2007) e depressão (OMS, 2011a) será importante a investigação destas condicionantes no momento de esclarecer as divergências entre a avaliação objectiva e subjectiva do sono dos idosos.

Uma outra forma de podermos entender a variabilidade nas características e nos componentes do sono em populações distintas, será através da análise do papel da "cultura" nesta relação entre o sono e a saúde. Países diferentes vivem as dificuldades e toda a experiência do sono de forma diversa (Airhihenbuwa et al., 2016; Bin et al., 2012; Gildner et al., 2014; Worthman & Brown, 2013) sugerindo que a cultura tem impacto nos vários aspectos da qualidade do sono. A cultura pode ser entendida como o

conjunto de normas, valores e códigos que são partilhados por um grupo, e que pela interação com o seu ambiente estão na base das crenças, das atitudes e dos comportamentos desse mesmo grupo (Airhihenbuwa et al., 2016). Assim, a pertença a uma determinada comunidade, um país, dentro dos mesmos limites geográficos e com um mesmo clima (Giosan, Fuller, Nicoll, Flad, & Clift, 2013), partilhando valores (Airhihenbuwa et al., 2016) e um idioma (Kramsch, 1998), dará forma ao contexto cultural no qual ocorre o sono. Daí a importância de também incluir na nossa investigação do sono a compreensão do factor "país", como referente à cultura, na relação que se estabelece entre qualidade do sono e saúde mental.

Bin et al. (2012) realizaram uma revisão sistemática com doze estudos que incluíram quinze países, com o objetivo de avaliar se a duração do sono dos adultos tem vindo a diminuir ao longo dos anos. Verificou-se que a duração média do sono era distinta em cada país, e ainda, que a evolução do número de horas dormidas também variava consoante o país. Em seis países diminuiu e em sete aumentou o número de horas dormidas ao longo dos anos. Matricciani, Olds e Petkov (2011) na sua meta-análise também constataram alterações na média de horas de sono em vários países ao longo do século XX. Estes detectaram um declínio de mais de uma hora por noite nalguns países, e por outro lado um aumento substancial de horas de sono noutros países. Assim, a duração do sono é um dos aspectos do sono que manifestamente varia consoante o país de origem. Outros investigadores sugerem que determinados aspectos que caracterizam o sono, como "com quem se dorme", "onde se dorme" e " as sestas" são vividos de forma diferente em distintas populações (Worthman & Brown, 2013). Soldatos, Allaert, Ohta, e Dikeos (2005), num estudo transversal com participantes de dez países (entre os quais Portugal, Espanha e Brasil), observaram variações globais importantes nos aspectos do sono, nomeadamente na qualidade do sono. Poderemos assim considerar que o país e a sua cultura contextualizam o quotidiano das populações influenciando os seus comportamentos, entre eles o sono.

Analisados alguns dos aspectos que caracterizam a variável "qualidade do sono" e as suas implicações na saúde mental, debruçamo-nos em seguida nos indicadores de saúde mental em estudo (Depressão, Ansiedade e Stress), com o objectivo de explanar os principais conceitos, prevalência e implicações na qualidade de vida dos indivíduos.

A depressão

As perturbações mentais ocorrem em todas as culturas e países, embora as diferenças culturais se façam sentir na manifestação dos sintomas e nas estimativas de prevalência (Ballenger et al., 2001). Estas perturbações representam a principal causa de incapacidade em indivíduos entre os 15 e os 45 anos em países como EUA e Canadá (OMS, 2004). Estas estimativas têm vindo a aumentar e a OMS prevê que a doença mental seja em 2020 a maior causa de baixa no trabalho.

A depressão é uma doença mental de grande prevalência que afecta as emoções, a cognição e o comportamento dos indivíduos. Caracteriza-se pela tristeza e/ou perda de interesse nas actividades que anteriormente eram apreciadas e pode levar a uma variedade de problemas emocionais e físicos que impedem o funcionamento laboral, familiar e social (APA, 2013). Segundo Lovibond e Lovibond (1995), a depressão está relacionada com a perda de auto-estima e motivação, e com a percepção que o indivíduo tem da fraca probabilidade de alcançar os seus objectivos de vida como pessoa. Numa visão mais recente e integrativa Beck e Bredemeier (2016) propõem que a depressão surge como um processo de adaptação para a conservação de energia após um investimento, interpretado pelo sujeito como infrutífero, numa área vital como: uma relação pessoal, pertença a um grupo, ou perdas. O indivíduo deprimido sente-se incapaz de viver as suas aspirações, sem rumo e fragilizado. Considerando que existem mais de 300 milhões de pessoas com depressão em todo o mundo (OMS, 2017) é esperado que as repercussões que esta perturbação tem nas diferentes sociedades, sejam consideráveis.

Na Europa estima-se uma prevalência de cerca de 20 milhões para a depressão e mais de 60 mil mortes anuais por suicídio (OMS, 2017). Os dados apontam para uma maior prevalência no género feminino e um aumento de probabilidade de depressão com o aumento da idade. Como também na qualidade do sono, o ser mulher e ter mais idade coloca o indivíduo numa posição de maior vulnerabilidade para o desenvolvimento desta perturbação. Alguns dos factores apontados para explicar a maior prevalência de depressão e ansiedade nas mulheres são: os papéis sociais, a violência doméstica, a desvantagem socioeconómica, as desigualdades salariais, estatuto social mais baixo ou subordinado, e as acrescidas responsabilidades familiares (OMS, 2017). Ainda de realçar que, embora com maior prevalência noutros grupos etários, a depressão cada vez é mais frequente em populações jovens com menos de 15 anos (OMS, 2017).

Uma das mais relevantes directrizes do fim do século passado na esfera da saúde refere-se ao foco dado à prevenção. Neste sentido, importa analisar qual a tendência na prevalência e as implicações da depressão nas próximas gerações. Também, uma análise mais aprofundada a esta realidade, permitirá contextualizar o grande impacto da depressão nas nossas sociedades. A prevalência da depressão constata-se em todas as faixas etárias e embora seja mais acutilante no intervalo dos 20 aos 45 (período activo), os adolescentes e jovens adultos também são significativamente afectados. A depressão e as suas consequências afectam cada vez mais os jovens e o seu efeito faz-se sentir negativamente no comportamento e na qualidade de vida (Sartoriuou, 2013).

Mojtabai, Olfsan e Han (2016) realizaram um estudo nos EUA com dados da National Surveys on Drug Use and Health, com 172 495 adolescentes (12 aos 17 anos) e 178 755 adultos (18 aos 25 anos). Neste pretendiam averiguar, entre outros, a prevalência dos Episódios de Depressão Major, no período de 2005 a 2014 numa população representativa dos EUA. Verificaram um aumento nos adolescentes de 8,7% em 2005 para 11,3% em 2014, e de 8,8% para 9,6% nos jovens adultos. Esta é uma

realidade preocupante, tendo em conta que adolescentes depressivos têm uma maior probabilidade de se tornarem adultos depressivos (Hankin et al., 2015). Ainda de salientar, o aumento no consumo de antidepressivos e de hospitalizações nesta faixa etária. Os custos económicos e humanos que advêm destas tendências, por si só são alarmantes, e mais ainda quando se reflectem sobre o futuro das populações e a sua qualidade de vida.

Numa sociedade globalizada, com excesso de informação, "sem tempo", insegura e inconstante, a depressão pode surgir como um mecanismo de defesa que protege o indivíduo do exterior ameaçador. Dados da Aliança Europeia Contra a Depressão (Hegerl, Rummel-Kluge, Värnik, Arensman, & Koburger, 2013), apontam que em Portugal as doenças mentais comuns afectam quase 23% dos portugueses adultos (mais de dois milhões por ano), e entre estas, a depressão afecta 7,9% dos adultos (400 mil pessoas). Ainda em Portugal, o registo nos cuidados de saúde primários de utentes com perturbações da depressão e perturbações da ansiedade tem vindo a aumentar desde 2011 (Programa Nacional para a Saúde Mental, 2017).

Outros dos dados inquietantes sobre a depressão em Portugal refere-se ao consumo de antidepressivos e antipsicóticos. Os portugueses duplicaram o consumo destas substâncias entre 2013 e 2016. Em relação às embalagens de ansiolíticos, sedativos e hipnóticos, o consumo aumentou mais de 90% (PNSM, 2017). Embora a mortalidade resultante directamente de problemas de saúde mental seja relativamente baixa, e quase exclusivamente relacionada com o suicídio, não é de descurar o impacto negativo que estes têm a curto, médio e longo prazo nas esferas familiar, social e profissional dos deprimidos. É ainda de considerar o impacto dos custos das doenças mentais na sociedade, que ascenderam em 2016 a mais de 125 milhões de euros, um aumento de 6,1% em relação a 2013 (PNSM, 2017).

Na população Espanhola 25% já padeceu, padece ou virá a padecer de doença mental, e a incidência de casos psiquiátricos tem aumentado. Em 2012 apurou-se que 9,3% dos internados hospitalares sofriam de doenças mentais, comparado com 9,7 % em 2016 (INE, Espanha, 2016). O custo directo das perturbações mentais oscilou de 150 para 372 milhões de euros, entre 2012 e 2016 (INE, Espanha, 2016).

No Brasil a prevalência da depressão também é significativa. A desigualdade social, a violência e a vulnerabilidade socioeconómica reflectem-se na saúde mental dos brasileiros. Segundo dados da OMS no Brasil 5,8% da população sofre de depressão, afectando um total de 11,5 milhões de Brasileiros. Esta é a maior prevalência na américa Latina e a segunda maior em todo o continente americano. Apenas os EUA registam mais deprimidos, 5,9% (OMS, 2017). O Instituto Brasileiro de Geografia e Estatística (IBGE, 2014) constatou que 10,2% dos brasileiros com 18 anos ou mais (um em cada dez) e desempregados sofrem de algum tipo de depressão. Já com a população trabalhadora regista-se uma menor percentagem de indivíduos com depressão: 6,2% (IBGE, 2014). Esta realidade vivida no Brasil corrobora os estudos que sugerem o efeito negativo produzido pela crise socioeconómica na saúde, no bem-estar e essencialmente

na saúde mental (Althouse, Allem, Childers, Dredze, & Ayers, 2014; Leal, Viseu, Jesus, Paixão, & Greenglass, 2014).

A depressão major é considerada uma das perturbações mentais mais incapacitante em todo o mundo (Üstün et al., 2004) e caracteriza-se pela sua elevada comorbidade. Co-ocorre frequentemente com a perturbação distímica e com outras perturbações mentais na população geral (ESEMeD/MHEDEA 2000 Investigators, 2004; Kessler, Chiu, Demler, & Walters, 2005, Kessler, Nelson, McGonagle, Frank, & Leaf,1996) e na população dos cuidados primários de saúde (Ansseau, Fischle, Albert, Leyman, & Mignon 2008; Mergl, Seidscheck, Allgaier, Möller, Hegerl, & Henkel, 2007). Também se regista comorbidade frequente entre a depressão e as perturbações somáticas crónicas (Nuijen, 2009).

Num estudo realizado por Kessler et al (2003) em 48 estados dos EUA, verificou-se que 72,1% dos participantes com depressão major crónica também cumpriam com os critérios para, pelo menos, uma outra perturbação mental. Entre estas, 59,2% com perturbações da ansiedade, 24% com perturbação de abuso de substâncias e 30,0% com perturbação do controle dos impulsos. Ainda, avaliando o prejuízo da depressão na esfera laboral, familiar, social e relacional, 96,9% dos participantes com depressão major nos últimos 12 meses reportaram comprometimento em pelo menos uma destas quatro áreas. A depressão e as suas consequências têm um impacto manifestamente negativo na rotina diária dos indivíduos, o que nos leva a reflectir sobre a necessidade de uma abordagem integrativa desta condição mental.

Vejamos, a comorbidade não significa apenas a soma de duas ou mais doenças e os seus sintomas. Um dos problemas da comorbidade reside na dificuldade de diagnóstico pelos técnicos especialistas, visto que estes terão uma maior preocupação e conhecimento do diagnóstico das doenças que conhecem e dominam. Este facto levará ao "não diagnóstico" de alguma das doenças presentes, o que por sua vez culminará num maior número de complicações e num tratamento menos eficaz, e num deficiente prognóstico da evolução do quadro clínico dos indivíduos.

A comorbidade existe entre perturbações mentais mas também, e largamente, entre a doença física e mental. Segundo Sartoriuos (2013) a comorbidade entre as doenças mentais e físicas tem aumentado drasticamente nas últimas décadas chegando a proporções epidémicas em alguns países. Mais concretamente a depressão também está intimamente ligada à doença física. A depressão major encontra-se geralmente em 15% dos pacientes com doença cardiovascular (Colquhoun et al., 2013). A doença cardiovascular e a depressão são actualmente as duas causas mais comuns de incapacidade em países com elevado poder de compra e com a expectativa de o serem também em todos os países em 2030 (OMS, 2004). Similarmente atesta-se a associação da depressão com doenças crónicas como a diabetes (Knol, Twisk, Beekman, Heine, Snoek, & Pouwer, 2006; Joseph & Golden, 2017), a obesidade (De Wit, Luppino, van Straten, Penninx, Zitman, & Cuijpers 2010; Nigatu, Reijneveld, de Jonge, van Rossum, & Bültmann, 2016), os problemas renais (Bautovich, Katz, Smith, Loo, & Harvey,

2014), e neurológicos (Asadi-Pooya et al., 2018; Kwon & Park, 2014), e também com algumas doenças neurológicas (e.g. epilepsia, esclerose múltipla, AVC) (Kanner, 2018), entre outras.

É inadiável a investigação e a criação de medidas de intervenção precoce na prevenção da depressão e de outras perturbações mentais pelo impacto que têm na qualidade de vida. Uma das implicações mais graves da depressão na sociedade será o suicídio. Segundo a OMS (2017) cerca de 800 000 morrem todos os anos por suicídio e este representa a segunda maior causa de morte em indivíduos dos 15 aos 29 anos de idade. Dirigindo-nos à realidade europeia, países como Portugal, Malta, Islândia e Polónia verificaram nos últimos 15 anos um aumento do suicídio. Mais concretamente, em Portugal, e segundo dados de 2013 da Aliança Europeia Contra a Depressão cerca de duas mil pessoas por ano cometem suicídio, destas mortes mais de mil são registadas como suicídio e as restantes como mortes violentas de causa indeterminada. Calcula-se, que mais de 75% destas mortes sejam suicídios escondidos (Kohls et al., 2017). Os custos diretos, indiretos e humanos do suicídio são intangíveis.

Com dados semelhantes, Espanha apresenta um número total de 3539 suicídios registados pelo Instituto Nacional de Estadística (INE) em 2012, o que supõe um aumento de 11% em relação a 2011, representando a taxa mais alta desde 2005 (INE, 2012). Também no Brasil, segundo a OMS (2011b) a taxa de suicídio aumentou de 3,3% em 1980 para 5,3 em 2012. Sendo que a depressão tem uma prevalência tão elevada neste país e as condições socioeconómicas têm vindo a degradar-se substancialmente nos últimos anos, é de esperar que a taxa de suicídio também tenha aumentado. Estudos comprovam que a taxa de suicídio cresce durante períodos de crise económica, quando as taxas de pobreza e desemprego tendem a aumentar (Hong, Knapp, & McGuire, 2011; Uutela, 2010), assim como também se eleva a violência e a insegurança.

Outra das implicações da sintomatologia depressiva é a falta de produtividade e o absentismo no trabalho. O impacto económico da depressão e da ansiedade para a economia global, tem um custo de um trilião de dólares por ano em perca de produtividade (OMS, 2017). A depressão pode influenciar o absentismo assim como também o desempenho dos trabalhadores no local de trabalho (presentismo), isto é, o trabalhador está presente mas o seu desempenho é afectado.

Alguns dos sintomas associados à depressão, como a perda de interesse em actividades do quotidiano e a incapacidade de as desempenhar, a falta de energia, a dificuldade na concentração e as dificuldades com o sono, entre outras, poderão significativamente ter um impacto negativo na produtividade. Segundo Henderson, Madan e Hotopf (2014), a depressão terá, entre todas as outras condições médicas, o maior impacto negativo na gestão do tempo e na produtividade. Numa sondagem nos EUA constatou-se que os trabalhadores deprimidos, faltam no total mais 68 milhões de dias por ano ao trabalho, comparativamente com os trabalhadores não deprimidos. Este

fato acresce um custo de 23 biliões de dólares em perda anual de produtividade (Witters & Agrawal, 2013).

A influência da depressão na saúde física e mental, na produtividade e na mortalidade por via do suicídio, faz com que esta tenha implicações no bem-estar do indivíduo e na sua qualidade de vida (Kinderman, Tai, Pontin, Schwannauer, Jarman, & Lisboa, 2015). O bem-estar é uma característica psicológica positiva relacionada com a satisfação e o sentimento de propósito na vida (Diener, Suh, Lucas, & Smith, 1999; Diener & Chan, 2011). A falta de prazer em actividades que anteriormente representavam momentos de bem-estar é uma das características centrais da depressão. Segundo Kinderman et al. (2015) embora o bem-estar subjectivo e os problemas de saúde mental tenham caminhos causais distintos, são conceitos elevadamente correlacionados. A qualidade de vida consiste numa percepção única e pessoal que abrange o estado de saúde e aspectos não médicos da vida. Os seus componentes principais são o bem-estar subjectivo e a satisfação com diferentes aspectos da vida, como, papéis sociais e condições ambientais (Zeitlhofer et al., 2000). Pelo impacto que a depressão tem na vida dos indivíduos é relevante a relação entre depressão, bem-estar e qualidade de vida.

A ansiedade

As perturbações da ansiedade são, tal como as da depressão, das mais prevalentes, e também com considerável variação cultural na sua expressão (APA, 2013; Ballenger et al., 2001). Segundo Lovibond e Lovibond, (1995) a ansiedade descreve-se por um estado persistente de ansiedade e intensas respostas comportamentais ao medo. Para Rojas (2014), a ansiedade é uma emoção de alarme que se experimenta com inquietude, desassossego, temor indefinido, preocupação excessiva e medo de perder o controlo. A sintomatologia da ansiedade inclui sintomas tão diversos como a preocupação constante, a agorafobia (evitamento), a interpretação catastrófica da realidade, a irritabilidade, os problemas com o sono, o constante estado de alerta, e também todos os sintomas neurovegetativos da ansiedade, entre outros.

A ansiedade tem por base uma das emoções mais ancestrais no ser humano, o medo. Na verdade, embora limitativo, este tem permitido ao homem a sua evolução ao longo dos séculos. A procura de segurança, o estado de alerta perante o perigo e a determinação em ultrapassar limites em prol do bem-estar estão intimamente ligados ao medo. A segurança e a liberdade são os alicerces da sociedade que de certa forma poderiam explicar como na actualidade se vive "em ansiedade". Se por um lado procuramos sentirmo-nos seguros, essa segurança impõe limites à nossa liberdade. O medo como factor de desenvolvimento pode também transformar-se num sintoma limitativo e disfuncional. Enquanto o medo se refere à resposta emocional a uma ameaça iminentemente real ou interpretada como tal, a ansiedade caracteriza-se pela antecipação à ameaça futura (APA, 2013).

O medo e a ansiedade estão intimamente ligados, mas podemos diferencia-los. O medo está mais associado à excitabilidade autonómica aumentada, necessária para a luta ou para a fuga, e aos pensamentos de perigo imediato e comportamentos de fuga. A ansiedade está mais frequentemente associada à tensão muscular e à vigilância em preparação para o perigo futuro, e aos comportamentos de cautela ou evitamento (APA, 2013).

A proporção da população aferida com perturbações da ansiedade em 2015 foi estimada em 3,6%, perfazendo um total de 264 milhões de pessoas em todo o mundo com estas perturbações (OMS, 2017). Também como na depressão, estas são mais comuns entre as mulheres (4,6% em comparação com 2,6% nos homens, a nível global) e contrariamente ao que sucede com a depressão, embora a sua prevalência não varie substancialmente com a idade, assiste-se a uma tendência para uma menor prevalência entre as pessoas mais idosas (OMS, 2017). Facto preocupante é o aumento exponencial de 14,9% destas perturbações desde 2005 (OMS, 2017), o que poderá resultar do crescimento da população e do envelhecimento, mas também de outros factores relacionados com a estrutura da nossa sociedade, caracterizada entre outras, pelo ritmo de vida acelerado e pela insegurança.

A análise de grandes estudos sobre a prevalência das perturbações psiquiátricas nos EUA constata que a ansiedade afecta 15,7 milhões de pessoas anualmente, prevendo-se que chegue aos 30 milhões de pessoas num futuro próximo (APA, 2013). Para além de todas as consequências pessoais vividas pelo indivíduo com ansiedade, existem também os custos económicos destas perturbações, como por exemplo, cuidados de urgências psiquiátricas e não psiquiátricas, hospitalização, prescrição de drogas, produtividade reduzida, absentismo no trabalho e suicídio (Lépine, 2002). O custo anual destas perturbações ascende a 74.4 milhões de dólares (Olesen et al., 2012).

Dados publicados pela OMS em 2017 dão a conhecer a realidade do impacto e prevalência mundial destas perturbações. Em Portugal, 4,9% da população sofre de ansiedade. Esta taxa coloca-nos abaixo de países vizinhos como a França, com 6,2% e a Itália com 5,0%, mas ainda assim acima da nossa vizinha Espanha com 4,1%. Na mesma linha o Programa Nacional para a Saúde Mental registou em 2016 que 6,06% dos utentes activos inscritos nos Cuidados de Saúde Primários padecem de perturbações da ansiedade (PNSM, 2017).

No Brasil 9,3% da população sofre de uma perturbação de ansiedade. Esta é a mais alta taxa do mundo de indivíduos com perturbações de ansiedade (OMS, 2017). Os factores socioeconómicos como a pobreza e o desemprego, os ambientais, o estilo de vida em grandes cidades, a insegurança, entre outros, serão responsáveis por esta elevada incidência entre os Brasileiros. Não será de descartar o possível efeito de outras realidades actuais nas nossas sociedades, como o das redes sociais, neste aumento de indivíduos com problemáticas relacionadas com a ansiedade. Estudos recentes revelam que nos jovens utilizadores das redes sociais, os que as utilizam por um maior período de tempo, são mais propensos a ter problemas mentais, sobretudo ansiedade, mas

também depressão e problemas de sono (Anxiety UK., 2012; Sampasa-Kanyinga & Lewis, 2015). Será de interesse avaliar que outros factores influenciam a prevalência da ansiedade nos jovens, futuros adultos, e nas consequências que daí advêm. Como temos observado as perturbações da ansiedade, tal como as da depressão, têm um grande impacto no funcionamento diário (Hendriks et al, 2015; Hendriks et al., 2016; Iancu, Bodner, & Ben-Zion 2015). No dia-a-dia do indivíduo ansioso, a variedade de sintomas da ansiedade pode ser altamente impeditiva em várias áreas: desde o absentismo e o presentismo (Bokma, Batelaan, van Balkom, & Penninx, 2017; Wynne et al., 2014), à dificuldade nos relacionamentos sociais (Kashdan & Farmer, 2014), ao evitamento (Bardeen & Fergus, 2016) e à falta de concentração (Matthews & Wells, 2014).

É de interesse também avaliar a comorbidade entre as perturbações da ansiedade e da depressão. A perturbação da ansiedade generalizada (PAG) e a perturbação de depressão major (PDM) são, de entre todas estas perturbações, as que têm a taxa de comorbilidade mais elevada (Sunderaland, Mewton, Slade, & Baillie, 2010). Dados da National Comorbidity Survey dos EUA constatam que a prevalência da comorbilidade entre a PDM e PAG é de 56,8% (Kessler et al., 2003). Segundo o DSM 5 (2013) a taxa de comorbidade entre a depressão e a perturbação de pânico pode ser entre 10 a 65% (APA, 2013).

Uma das características mais preocupantes da ansiedade, e também da depressão, é a relação com o consumo abusivo de álcool e de outras substâncias, por jovens, adultos e idosos (Forlani et al., 2014; Goldner, Lusted, Roerecke, Rehm, & Fischer, 2014; Lai, Cleary, Sitharthan, & Hunt, 2015; Gray & Squeglia, 2017; Welsh et al., 2017). O indivíduo ansioso e/ou depressivo consome álcool e outras substâncias para conseguir lidar com os afectos negativos resultantes da perturbação. Lai et al. (2015), numa meta-análise que inclui 115 artigos científicos, com amostras não-clínicas, veio a comprovar a forte associação do consumo de álcool e substâncias ilícitas com as perturbações do humor e da ansiedade. Assim, a grande probabilidade de estes quadros clínicos surgirem em comorbidade alerta-nos para a necessidade de uma melhor prevenção e capacidade de diagnóstico.

Observemos por exemplo o caso da ansiedade e a produtividade. Hoje em dia no contexto laboral, cada vez é mais solicitada a capacidade de adaptação emocional, flexibilidade e autocontrole, características estas que estão diminuídas num indivíduo ansioso. Greenberg et al. (1999), com dados da National Comorbidity Study, verificaram que as perturbações da ansiedade, à excepção da fobia simples, estavam associadas à incapacidade de desempenho no trabalho. Mais recentemente, outros estudos têm constatado que indivíduos com perturbações da ansiedade e da depressão apresentam mais incapacidade no trabalho e mais absentismo que os indivíduos sem perturbação mental (de Graaf, Tuithof, Van Dorsselaer, & Ten Have; Hendriks et al., 2015; Hendriks et al., 2016). Ainda, Brenes (2007) num estudo com 919 participantes verificou que os que exibiam sintomatologia moderada ou grave de ansiedade ou depressão, apresentavam maior índice de incapacidade em todos os domínios da qualidade de vida, que os participantes com diabetes ou dificuldades cardiovasculares.

Um factor importante na avaliação da qualidade de vida, como já tínhamos referido, é a saúde.

A ansiedade também tem implicações na saúde física. Estudos anteriores têm constatado a relação entre a ansiedade e a fibromialgia (Alok Das, Agarwal, Salwahan, & Srivastava, 2011), a doença cardiovascular (Batelaan, Seldenrijk, Bot, Van Balkom, & Penninx 2016) e a dor (de Heer et al., 2014; Lerman, Rudich, Brill, Shalev, & Shahar., 2015), entre outras. Mendlowicz e Stein (2000) numa revisão sistemática sobre a qualidade de vida em indivíduos com diagnóstico de perturbação de pânico, ansiedade social e stresse pós-traumático, ansiedade generalizada e perturbação obsessiva compulsiva, verificaram como estas perturbações estavam associadas a comprometimento na qualidade de vida e no funcionamento social.

O stresse

A depressão, a ansiedade e o stresse embora sejam entidades nosológicas bem diferenciadas estão intimamente ligadas (Daniel et al., 2013; Ghorbani, Krauss, Watson, & LeBreton, 2008; Wiegner, Hange, Björkelund, & Ahlborg, 2015). Lovibond e Lovibond (1995) descrevem o stresse como a excitação e a tensão permanente com baixo nível de resistência à frustração e à decepção. Para Jesus (2007), o stresse é uma reacção do indivíduo a uma situação que este interpreta como requerendo um maior esforço da sua parte para poder superá-la e adaptar-se às novas circunstâncias. Mais recentemente, Ganster e Rosen (2013) definem o stresse como um processo pelo qual determinados acontecimentos psicossociais (stressores) iniciam uma série de reacções psicológicas e cognitivas, que por fim afectarão o bem-estar. Esta última definição realça o impacto que o estado de stresse pode ter no desenvolvimento de outos estados fisiológicos e de perturbações psicológicas, como a depressão e a ansiedade.

O modelo Allostatic Load (AL) (McEwen & Stellar, 1993) surge como o modelo teórico dominante na explicação do stresse como um processo (Juster, McEwen, & Lupien, 2010; Lupien et al., 2015; McEwen & Stellar, 1993). Este modelo identifica três fases distintas no processo de stresse. Na primeira fase ocorre a estimulação dos *mediadores primários* (e.g., hormonas do stresse) que funcionam em prol da adaptação inicial do indivíduo ao agente stressor, com o objectivo de preparar o organismo para lidar com as ameaças que alteram os sistemas homeostáticos. Na segunda fase desenvolvem-se no sistema nervoso central processos psicológicos (medo, tensão, ansiedade), fisiológicos (libertação de cortisol e epinafina), e psicossomáticos (problemas com o sono, dores de cabeça, fadiga) que quando estimulados cronicamente, levam à activação dos *mediadores secundários* (i.e., sistema imunitário, cardiovascular e metabólico) (Ganster & Rosen, 2013). O sistema imunitário, cardiovascular e metabólico reajusta o seu funcionamento face à sub e sobre produção dos *mediadores primários*. Quando estes mediadores funcionam continuamente de forma desregulada levam ao aparecimento da doença física e mental. Desenvolve-se a seguir a terceira fase chamada de *"Allostatic overload",* a qual sumariza o impacto cumulativo do desgaste

fisiológico relacionado com os padrões de stresse mal adaptativo que predispõem os indivíduos à doença. Esta fase caracteriza-se pelo desenvolvimento de doença física (doença cardiovascular, diabetes, entre outras), doença mental (depressão clínica, bipolaridade), e mortalidade. Neste modelo os vários sistemas de adaptação interagem de forma complexa, sequencial e não-linear (Ganster & Rosen, 2013).

Outros autores também sugerem que a exposição ao stresse tem um papel causal na etiologia da depressão (Bartolomucci & Leopardi, 2009; McEwen, & Rasgon, 2018) e da ansiedade (de Quervain, Schwabe, & Roozendaal, 2017). Todavia, o stresse em níveis moderados também pode ter implicações positivas na realização pessoal e profissional ao impulsionar o indivíduo para a resolução de problemas e tomada de decisões (Jesus, 2001; Vaz Serra, 2011).

Para além do seu impacto na saúde mental o stresse também influencia o desenvolvimento da doença física. Os processos que se desenvolvem no sistema nervoso central e que são responsáveis pelo stresse podem influenciar o processamento da dor, alterando a percepção à dor e aumentado a sensibilidade (Cathcart, Winefield, Lushington, & Rolan, 2010). Outras doenças associadas ao stresse são as doenças infecciosas e auto-imunes (Cohen, Janicki-Deverts, & Miller, 2007), as doenças cardíacas (Cohen & Janicki-Deverts, 2012; Gallo et al., 2014; Pais Ribeiro, 2005), alguns tipos de cancro com mediação viral (Cohen & Janicki-Deverts, 2012), gastrites, doenças de pele e alergias, enxaquecas, crises asmáticas, insónia e hipertensão arterial (Ogden, 2004; Pais Ribeiro, 2005). Contudo, Vaz Serra (2011) entende que o stresse, tanto na doença física como na doença mental, é o factor precipitante, sendo necessária a existência de uma vulnerabilidade prévia para que a doença se desenvolva.

Quando perante um determinado estímulo sentimos o nosso bem-estar desafiado ou ameaçado entramos em stresse. Até um determinado nível, e quando não contínuo, este indicador permite um estado de alerta propício à autoconservação, mas quando contínuo e intenso produz patologia. A sondagem "Stress in America" tem analisado como o stresse tem afectado a saúde e o bem-estar dos adultos nos EUA desde 2005. Duas das principais causas apontadas pelos indivíduos sondados para o seu stresse, até 2015, foram o "dinheiro" e o "trabalho". No entanto, em 2015 uma outra causa aumentou significativamente de forma a alcançar o terceiro lugar nas causas mais associadas ao stresse, as "responsabilidades familiares". A estas seguiram-se as "preocupações com a própria saúde", os "problemas de saúde que afectam a família" e a "economia" (APA, 2015). O relevo do trabalho e ambiente laboral no desenvolvimento do stresse, explica o porquê da maior parte dos estudos se focarem nesses fatores.

A Organização Mundial da Saúde intitulou o stresse de "Health Epidemic of the 21st Century", isto é, a epidemia de saúde do século XXI. Estima-se que entre 1983 e 2009 os níveis de stresse tenham aumentado de 10 a 30% em todas as regiões demográficas dos EUA (Cohen & Janicki-Deverts, 2012). O stresse laboral tem um custo aproximado de 300 biliões por ano para as empresas norte americanas (Rosch, 2001).

Já foi referido o impacto que o ambiente e as condições de trabalho têm nos níveis de stresse sentidos pelos trabalhadores (i.e, stresse laboral), agora importa também salientar como a investigação tem vindo a associar este tipo de stresse a doenças físicas, como a doença cardiovascular (Cooper & Quick, 2017; Gogh, Pfeffer, J., & Zenios, 2015a; Goh, Pfeffer, Zenios, & Rajpal 2015b). Numa meta-análise de 228 estudos, Gohg et al. (2015b) concluíram que as elevadas exigências no trabalho aumentavam em 35% a possibilidade de ter uma doença diagnosticada, e o elevado número de horas no trabalho aumentava a mortalidade em quase 20%. Dados preocupantes que não se registam apenas na zona geográfica dos EUA. Informação obtida pela Agência Europeia para a Segurança e Saúde no Trabalho (EASHW) numa sondagem com 31 países, confirmou que esta realidade também aflige a Europa, e coloca Portugal como o sétimo país europeu com mais stresse no trabalho, com uma taxa de incidência de 59%. Chipre surge com a taxa de stresse mais elevada (88%) e Liechtenstein (3,5%) como o país com a menor taxa de stresse (EASHW, 2013).

Embora a prevalência do sintoma stresse seja elevada, as questões culturais continuam a influenciar como é vivido em diferentes comunidades. Nos EUA o dinheiro e o trabalho surgem como causas principais de stresse, já em Espanha, a percepção das causas de stresse são diferentes. Neste país nove em cada dez indivíduos, entre os 18 e os 65 anos, relatam já ter sentido stresse no último ano e quatro em cada dez sofreram-no de forma continuada e frequente (Sociedad Española para el Estudio de la Ansiedade y del Estrés - SEAS, 2017), no entanto as causas apontadas para o stresse são percepcionadas de forma distinta. Os participantes espanhóis afirmaram que a principal causa de stresse é a falta de tempo/excesso de actividade com 50,9%, seguida de problemas de cansaço ou sono com 46,2% e apenas em terceiro lugar a problemática laboral com 43,2%. O quarto lugar é ocupado pela doença do indivíduo ou de um familiar, com 41,4%. Ainda de salientar o grande impacto do stresse na saúde com 53,3% dos espanhóis a desenvolver uma doença física ou mental (SEAS, 2017). Numa realidade mais longínqua geograficamente verifica-se que o Brasil detém o segundo índice mais elevado de stresse, num ranking de 10 países, com 30% da população afectada. O Japão ocupa o primeiro lugar com 70% (International Stress Management Association - ISMA, 2013). Tal como nos EUA, no Brasil a principal causa indicada como causadora de stresse foi o trabalho, com 62% dos entrevistados associando o stresse às condições laborais (ISMA, 2013).

O género e a idade também representam factores a ter em consideração quando se analisa a prevalência do stresse. Numa sondagem da APA, a média dos níveis de stresse das mulheres em 2015 continuava mais elevada que a dos homens (5.3 vs. 4.9 numa escala até 10), embora a diferença tenha diminuído ligeiramente comparativamente com dados de 2014 (5.2 vs. 4.5) (APA, 2015). Alguns autores têm corroborado estes dados com as mulheres a apresentar sistematicamente níveis mais elevados de stresse que os homens (Mayor, 2015; Matud, 2004; McDonough & Walters, 2001). Outros estudos concluem que a idade influencia os níveis de stresse (APA, 2015; Lévesque, Moskowitz, Tardif, Dupuis & D'antono 2010). A sondagem da APA

verificou que os adultos mais jovens relatam os níveis mais elevados de stresse, e uma maior probabilidade de que os seus níveis de stresse tenham aumentado no último ano (APA, 2015).

A revisão de literatura realizada permite-nos concluir que a qualidade do sono afecta a saúde mental de populações clínicas e não-clínicas, isto é, a qualidade do sono tem impacto nos indicadores de saúde mental (depressão, ansiedade e stresse). Contudo, parece haver evidências empíricas de que existem fatores sociodemográficos que influenciam esta relação. O género, a idade e o país podem ter um efeito moderador na relação entre a qualidade de sono e a saúde mental. Assim, o impacto que a qualidade do sono tem na depressão, na ansiedade e no stresse, pode depender de ser mulher ou homem, da faixa etária e do país de origem. Diante das evidências é essencial o desenvolvimento de estudos que promovam o conhecimento sobre as diferenças sociodemográficas e culturais na relação entre a qualidade do sono e a saúde mental, de forma a desenvolver políticas de sensibilização e técnicas de intervenção adequadas a cada população.

Objetivos e questões de investigação

A presente investigação teve como principais objectivos estudar a relação entre a qualidade do sono e, a depressão, a ansiedade e o stresse (indicadores de saúde mental) numa amostra não-clínica e, avaliar o papel moderador do género, da idade e do país de origem no efeito da qualidade do sono sobre os diferentes indicadores de saúde mental.

Os estudos empíricos apresentados, publicados em revistas internacionais da especialidade, procuraram dar resposta a questões de investigação tão específicas como: Qual será o impacto da qualidade global do sono na depressão, na ansiedade e no stresse (indicadores de saúde mental)? Será que o género modera a relação supramencionada? Será que a idade modera a influência da qualidade de sono nos indicadores de saúde mental? Será que o país modera o impacto da qualidade de sono na depressão, na ansiedade e no stresse? Será que as várias componentes do sono influenciam individualmente a saúde mental? Será que a idade, o género e o país moderam a relação entre cada componente do sono e os indicadores de saúde mental?

2. Estudo 1: “Sleep quality and stress: A literature review”

Becker, N. B., de Jesus, S.N., Marguilho, R., Viseu, J. N., João, K. A. D. R. & Buela-Casal, G. (2015). Sleep quality and stress: A literature review. *Advanced Research in Health, Education and Social Sciences: Towards a better practice,* Chapter IV. Romania. 48-62

Abstract

The present literature review aims to analyze the research published between 2005 and 2015 relatively to the relationship between stress and sleep quality, using the Pittsburgh Sleep Quality Index (PSQI) as an instrument to assess the sleep aspects. This review was conducted in May 2015 based on the electronic databases Web of Science and EBSCO. We used the keywords “sleep quality” and “stress” focusing our target on empirical studies. After reading the collected studies (n=1267), only those who comprised adult samples were selected, resulting in a total of 15 studies. It was found that stress is associated with several individual factors, such as age, employment status, type of work, personality, level of education, and socio-economic status. When considering the use of the PSQI, stress also influenced the quality of sleep as a whole and in its specific components. Depression was considered important in stress relatively to the sleep quality, other relevant variables were the sociodemographic indicators and socioeconomic status. Therefore, it is essential to assess the context of stress and sleep quality so one can establish new explanations for their relationship and functions. In conclusion, it is necessary to develop thorough studies that take into consideration the importance of complementary variables, i.e., psychosocial, sociodemographic, and socioeconomic status, in the context of the quality of sleep. In this way, it will be possible to understand the effects of the quality of sleep in different samples.

Keywords: Literature review, PSQI, Sleep quality, Stress

Introduction

Sleep is a vital and complex physiological process inherent in each individual. In the last years, several studies (e.g., Nunes da Silva, Martins Costa, Waquim Machado, & Lopes Xavier, 2012) found that this process is affected by social, cultural, and environmental aspects. Nowadays, the demands that an individual suffers, especially from social and organizational contexts, have resulted in high levels of stress and poor sleep quality (Kurina et al., 2011). Moreover, organic disorders have contributed to an increase in the number of diseases associated with sleep quality (Carlson, Campbell, Garland, & Grossman, 2007).

The risks related with sleep disorders may include cardiovascular problems (Kashani, Eliasson, & Vernalis, 2012), cancer (Carlson et al., 2007), and metabolic disorders (Luyster, Strollo, Zee, & Walsh, 2012; Theadom & Cropley, 2008). Some studies have also established sleep as an important element in psychiatric conditions (Baglioni, Nanovska et al., 2014a; Baglioni, Spiegelhalder et al., 2014b). Poor quality of sleep and insomnia are related to emotion, previous studies have observed the effects of loneliness, grief, hostility, impulsivity, stress, depression, and anxiety on sleep (Baglioni, Spiegelhalder, Lombardo, & Riemann, 2010; Cho et al., 2013; Gallagher, Phillips, & Carroll, 2010; Okun, Tolge, & Hall, 2014). Emotion and sleep have shown a close relationship, which is increasingly recognized as an important area of research (Kurina et al., 2011).

Recent studies have reported some mechanisms of sleep (Carter et al., 2012; Siegel, 2011) in an effort to understand its behavioral complexity and advancing beyond pathological descriptions, trying to understand the processes that lead to a good quality of sleep (Hawkley, Lavelle, Berntson, & Cacioppo, 2011; McHugh, Casey, & Lawlor,

2011; Mellor, Waters, Olaithe, McGowan, & Bucks, 2014; Miró, Cano-Lozano, & Buela-Casal, 2005).

The increasing need to assess which factors strongly influence the quality of sleep has grown over the years. It was found that biological traits are not always associated with the perception of poor quality of sleep (Hayase, Shimada, & Seki, 2014), creating the necessity to understand these associations. One way to assess the subjective quality of sleep is through the Pittsburgh Sleep Quality Index (PSQI). This instrument provides an accurate picture of seven different aspects of sleep: (a) sleep duration; (b) sleep disturbance; (c) sleep latency; (d) daytime dysfunction; (e) sleep efficiency; (f) subjective sleep quality; and (g) use of sleep medication (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989). Being a self-report measure, it may be more relevant in the clinical practice than the objective sleep measures (Buysse, 2005; McHugh et al., 2011).

Psychological and psychosocial factors have contributed significantly to the comprehension of the sleep quality (McHugh et al., 2011). Studies have underlined the importance of evaluating the influence of stress on the processes concerning the proper functioning of sleep (Cho et al., 2013; Gamaldo et al., 2014; Kashani et al., 2012; Ko, Chang, & Chen, 2010; Okun et al., 2014), given that it is an essential dimension of health (Buysse, 2014). Knowing the importance of stress and sleep quality for health, conducting a review on the empirical studies addressing this topic is relevant, particularly since there are no previous literature reviews or meta-analysis published about this relationship.

Stress may conduce to negative health implications, including increasing the likelihood of cardiovascular disease, directly affecting the nervous system, as well as increasing the probability of involvement in risk behaviors, such as smoking and

excessive alcohol consumption, which will propitiate a poor quality of sleep (Hawkley, Masi, Berry, & Cacioppo, 2006; McHugh & Lawlor, 2013).

Therefore, our aim is to review the studies on sleep quality using the PSQI, one of the main self-report instruments on sleep evaluation, in order to understand how this construct relates to stress. With the collected information, we hope to contribute directly and indirectly to the increase of individuals' subjective perception of well-being, health, and quality of life.

Method

Procedure

This review was conducted in May 2015 in the electronic databases Web of Science (WoS) and EBSCO. The keywords used were "sleep quality" and "stress". The collected studies should have been published between 2005 and 2015. The research was divided in four phases (Figure 1): (a) 1267 references were found using the previously chosen keywords; (b) the relevance of the studies was based in the following criteria: (b1) studies published in scientific journals; (b2) empirical study; (b3) presence of enough data to analyse "what has been studied" and "how it was studied"; and (b4) the use of the Pittsburgh Sleep Quality Index (PSQI). Thus, after the second phase, the number of studies registered was 125; (c) considering the use of two research sources, some studies were repeated and, therefore, excluded, resulting in 76 studies; and (d) in this last phase, only studies that were composed by adult samples were considered, which resulted in 15 articles.

After the fourth phase (i.e., phase d), the 15 selected studies were assessed regarding the following information: (a) authors; (b) year of publication; (c) type of

sample; (d) instruments used; and (e) obtained results. The taxonomy of Montero and León was applied in the classification of these studies.

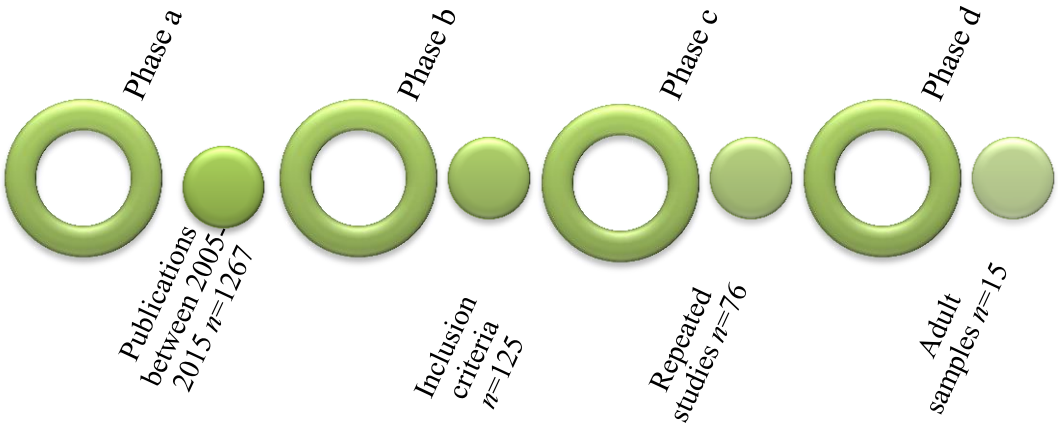

Figure 1. Phases of the literature review. In each phase are presented the number (n) of studies that remained in the sample.

Results

The theoretical perspective was confirmed by a selection of studies with identical subjects (i.e., adults). The characterization of the "sleep" variable had the same approach, although there are some differences regarding sleep quality. The "stress" variable was evaluated in different perspectives, for instance (a) perceived stress; (b) symptoms of stress; (c) mood states; and (d) biological traits. These perspectives were not discriminated, given that they rely on self-evaluation methods. The methodological approach was common to all studies (i.e., quantitative approach) and pointed to works where the PSQI was the instrument used to evaluate sleep quality in adult samples.

Table 1 displays the authors, year of publication, type of sample, age/status, and total number of participants. The total number of participants was 11025, the majority were females (8797) while 1777 were males. Moreover, in the studies of Cho et al.

(2013) and Cohrs et al. (2012) a higher percentage of female participants, respectively 4966 (about 36% of total participants) and 1340 (about 10% of total participants), was registered comparatively to the other evaluated studies. Regarding the type of sample, three studies were composed by pregnant women (Hayase et al., 2014; Ko et al., 2010; Okun et al., 2014).

Table 1. Articles Included in the Literature Review and Participant Characterization (N = 15)

Authors/year	Type of sample Age/Status	*N* Total	M/F
Carlson et al. (2007)	Adults/Women with breast cancer	66	0/66
Cho et al. (2013)	Adults/Women workers	4966	0/4966
Cohrs et al. (2012)	Adults/Smokers	2314	974/1340
Costa, Zummer, and Fitzcharles (2009)	Adults/Spondyloarthropathy	125	58/67
Eliasson, Kashani, Dela Cruz, and Vernalis (2012)	Adults/Soldiers	265	236/29
Gallagher et al. (2010)	Adults/Parents caring for children with developmental disabilities	109	26/83
Gamaldo et al. (2014)	Adults/Older blacks	606	153/449
Hayasse et al. (2014)	Adults/Pregnant women	56	0/56
Kashani et al. (2012)	Adults/ Cardiovascular disease prevention program	350	138/212
Ko et al. (2010)	Adults/Pregnant women	600	0/600
McHugh and Lawlor (2013)	Older adults/General population	447	-
Mellor et al. (2014)	Adults/General population	582	154/428
Okun et al. (2014)	Adults/Pregnant women	170	0/170
Rocha and Martino (2010)	Adults/Hospital nurses	203	24/179
Theadom and Cropley (2008)	Adults/Fibromyalgia	166	14/152
	Total	11025	1777/8797

Note. M = Male, F = Female.

Table 2 shows the main results of the studies conducted on sleep quality and stress.

Table 2. Main Results of the Studies Conducted on Sleep Quality and Stress (N = 15)

Authors/year	Instruments	Results
Carlson et al. (2007)	SOSI[1]; CES-D[2]; STAI[3]; POMS[4]; PSQI[5]; BM[6]	Women with breast cancer had significantly higher levels of disorder on all psychological indicators, but there were no differences between the groups on any of the biological measures.
Cho et al. (2013)	PSQI[5]; KOSS-SF[7]; CES-D[2]	The depressive symptoms of female workers were closely related to their job stress and sleep quality. In particular, the lack of rewards and subjective sleep factors had the greatest impact.
Cohrs et al. (2012)	PSQI[5]; FTND[8]; QSU[9]; BDI[10]; STAI[3]; AUDIT[11]; PSS[12]	Direct aspects related to smoking seem to have a strong effect on sleep quality.
Costa, Zummer, and Fitzcharles (2009)	BASDAI[13]; BASFI[14]; PSQI[5]; CES-D[2]; PSS[12]; ACLS-PAQ[15]	Higher perceived stress was an independent contributor of poor sleep quality.
Eliasson, Kashani, Dela Cruz, and Vernalis (2012)	PSQI[5]; PSS[12]; ESS[16]; FS[17]; MDQ[18]; BQ[19]; SQSD[20]	Soldiers with high stress, depression, poor sleep quality, and sleep apnea are at increased long-term risk for cardiovascular complications.
Gallagher et al. (2010)	PSQI[5]; QRSF[21]; SDQ[22]; SFS[23]	Parental stress is associated with poor sleep quality in parents of children with developmental disabilities.
Gamaldo et al. (2014)	PSQI[5]; CVRFs[24]; CES-D[2]	Perceived stressors, including current financial hardship or hardship experienced for an extended period throughout the lifespan, may influence sleep later in life.
Hayasse et al. (2014)	PSQI[5]; PSS[12]; BM[6]	Pregnant women with pregnancy-induced hypertension and gestational diabetes mellitus experience higher stress levels than the non-pregnant women and healthy pregnant women. Further, the results indicated that sleep quality worsens during the third trimester compared with the second.
Kashani et al. (2012)	PSS[12]; PSQI[5]; ESS[16]; FS[17]; BQ[19]	High stress was associated with significant disorders in sleep duration and quality. Stress levels also

		correlated with daytime consequences of disturbed sleep. The stress-sleep relationship may be an important mediator in the association between stress and cardiovascular disease.
Ko et al. (2010)	PSQI[5]; EPDS[25]; PSS[12]	The sleep quality of pregnant women was related to stress and depression, and comparatively to the non-pregnant women they tend to have a poor sleep quality.
McHugh and Lawlor (2013)	JGSL[26]; PSQI[5]; PSS[12]; NACI[27]	The impact of emotional loneliness on sleep quality in older adults is partly because of the stress experienced as a result of feeling lonely.
Mellor et al. (2014)	PSQI[5]; DASS-21[28]; BQ[19]	Sleep-related risk factors, such as gender, psychological symptoms, and risk of sleep-disorder breathing, although related to sleep quality, did not have an impact on the relation between age and sleep quality.
Okun et al. (2014)	PSQI[5]; MMA[29]; SDD[30]; PSS[12]; IDS[31]	Perceived stress and financial strain attenuated the socioeconomic status-sleep association, indicating that psychological situations preceding pregnancy are also important to consider.
Rocha and Martino (2010)	PSQI[5]; BSSm[32]	There is a significant correlation between stress and sleep. Nurses working in the morning shifts showed higher stress levels and poorer sleep quality.
Theadom and Cropley (2008)	DBAS-10[33]; PSS[12]; PSQI[1]; FAS[34]; SF-36[35]	Beliefs about sleep and perceived stress play a significant role in the sleep quality of patients with fibromyalgia.

Note. [1]Symptoms of Stress Inventory (SOSI); [2]Centre for Epidemiological Studies – Depression Inventory (CES-D); [3]Spielberger State-Trait Anxiety Inventory (STAI); [4]Profile of Mood States (POMS); [5]Pittsburgh Sleep Quality Index (PSQI); [6]Biological Measures (BM); [7]The Korean Occupational Stress Scale-Short Form (KOSS-SF); [8]The Fagerström Test of Nicotine Dependence (FTND); [9]Questionnaire of Smoking Urges (QSU); [10]Beck Depression Inventory (BDI); [11]Alcohol Use Disorders Identification Test (AUDIT); [12]Perceived Stress Scale (PSS); [13]Bath Ankylosing Spondylitis Disease (BASDAI); [14]Bath Ankylosing Spondylitis Functional Index (BASFI); [15]Aerobics Center Longitudinal Study Physical Activity Questionnaire (ACLS-PAQ); [16]Epworth Sleepiness Scale (ESS); [17]Fatigue Scale (FS); [18]Mediterranean Diet Questionnaire (MDQ); [19]Berlin Questionnaire (BQ); [20]Single Question to Screen for Depression (SQSD); [21]Questionnaire on Resources and Stress Freidrich Short Form (QRSF); [22]Strenghs and Dificulties Questionnaire (SDQ); [23]Support Functions Scale (SFS); [24]Cardiovascular Risk Factor Composite Score (CVRFs); [25]Edinburgh Postnatal Depression Scale (EPDS); [26]Jong Gierveld Scale of Lonelines (JGSL); [27]Charlson Co-

morbidity Index (NACI); [28]Depression, Anxiety, and Stress Scale (DASS-21); [29]Mini Mitter Actiwatch-64 (MMA); [30]Sleep Diary Data (SDD); [31]Inventory for Depressive Symptoms (IDS); [32]Bianchi Stress Scale Modified (BSSm); [33]Dysfunctional Beliefs and Attitudes About Sleep Scale (DBAS-10); [34]Fatigue Assessment Scale (FAS); [35]Short-Form Medical Outcomes Questionnaire (SF-36).

Discussion

The present study reviewed the papers that evaluated the relationship between stress and sleep quality in adults, using the PSQI as a measure to assess the sleep aspects. All the studies were based on self-report ratings, mainly studying the subjective quality of sleep.

The type of sample existent in the analyzed studies (i.e., adults) presents a heterogeneity level that enables us to verify aspects of sleep quality and stress in diverse contexts. Variety is important because nowadays the quality of sleep and stress are capable of affecting health both in individuals suffering from any kind of medical condition as in individuals from the general population. In this review we covered samples with particular characteristics: (a) pregnant women; (b) smokers; (c) workers; (d) soldiers; (e) older blacks; (f) parents of children with developmental disabilities; and (g) nurses.

We selected the PSQI as an assessment tool for sleep quality because it addresses seven aspects of sleep and it is widely used in the research of this topic. The research on sleep quality has been carried out with self-report instruments. On one hand, they are limited regarding objective evidence, however they are able to show individual perceptions, thus becoming useful in the clinical setting (Buysse, 2005). Moreover, research has shown that objective assessments (i.e., biological traits) do not always address the psychological disorders that can be evaluated by subjective measures (i.e., self-reports) (Hawkley, Lavelle, Berntson, & Cacioppo, 2011).

Our review underlined the influence of stress on the perceived quality of sleep (Cho et al., 2013; Gallagher et al., 2010; Gamaldo et al., 2014; Hayase et al., 2014; Kashani et al., 2012; Ko et al., 2010; McHugh & Lawlor, 2013; Okun et al., 2014; Rocha & Martino, 2010; Theadom & Cropley, 2008), which emphasizes the importance of considering the inclusion of this variable in research on sleep quality. The high levels of stress in pregnant women (Hayase et al., 2014; Ko et al., 2010) and individuals with chronic diseases (Costa et al., 2009; Theadom & Cropley, 2008) further worsen their sleep quality. It is necessary to pay special attention to pregnant women or people suffering from any medical condition, especially if chronic, performing periodic evaluations. The first reason is the fact that these individuals are more likely to have compromised the quality of sleep at some level (Hayase et al., 2014; Ko et al., 2010; Okun et al., 2014; Sayar, Arikan, & Yontem, 2002; Wilcox et al., 2000). The second reason is the possibility of establishing adequate preventive interventions to avoid the negative effects of poor sleep quality and stress. In addition, stress variables, such as depression (Cho et al., 2013; Eliasson et al., 2012; Gallagher et al., 2010; Ko et al., 2010; Okun et al., 2014; Rocha & Martino, 2010), anxiety, fatigue, confusion (Carlson et al., 2007; Da Costa et al., 2009; Theadom & Cropley, 2008), loneliness (McHugh & Lawlor, 2013), age (Mellor et al., 2014), race (Gamaldo et al., 2014), socioeconomic status (Lallukka et al., 2012; Okun et al., 2014; Patel, Grandner, Xie, Branas, & Gooneratne, 2010), and smoking (Cohrs et al., 2012), can directly or indirectly influence the self-perceived quality of sleep.

Improving the quality of sleep is an action that can be, in some cases, carried out by manipulating these variables without necessarily administering medication for specific purposes. In accordance, studies should indicate actions to reduce stress and depression in order to improve the sleep quality (Ko et al., 2010), for example massage

or relaxation (Bastani, Hidarnia, Kazemnejad, Vafaei, & Kashanian, 2005), music therapy, meditation or yoga (Narendran, Nagarathna, Narendran, Gunasheela, & Nagendra, 2005), and psychosocial approaches (McHugh et al., 2011).

Several mechanisms have been proposed to explain the relationship between stress and quality of sleep, including physiological arousal (Freedman & Sattler, 1982; Van Reeth et al., 2000) and poor coping mechanisms to adaptively manage stress, evidenced by findings from Morin, Rodrigue, and Ivers (2003) in a sample of healthy adults suffering from primary insomnia. This leads to the understanding that stress is an important part of one of several variables that influence the quality of sleep, particularly concerning subjective evaluation. Regarding biological traits, the variations are not always significant, neither in the matter of the quality of sleep nor in the matter of stress (Carlson et al., 2007; Hayase et al., 2014).

In conclusion, it is necessary to develop further studies considering the importance of complementary variables, i.e., psychosocial, sociodemographic indicators, and socioeconomic status, in the context of the quality of sleep. Also, it is necessary to understand the relationship between the quality of sleep and stress, enabling, in the future, a proper understanding of the effects on sleep quality in different samples.

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3. Estudo 2: “Sleep quality, depression and anxiety: A literature review”

João, K. A. D. R., Becker, N. B. & de Jesus, S.N. (2016). Sleep quality, depression and anxiety: A literature review. *Prospecting interdisciplinarity in health, education and social sciences: theory and practice.* Chapter II. Romania. 10:37-52

Abstract

This literature review aims to analyze the research published between 2011 and 2016 relatively to the relationship between sleep quality, depression and anxiety, using the Pittsburgh Sleep Quality Index (PSQI) as an instrument to assess the sleep aspects. It was conducted in Feb 2016 in the electronic databases Web of Science (WoS) and EBSCO which were efficient tools to find the necessary heterogeneity for the selection of the relevant studies. The key words used were "sleep quality", “depression” and “anxiety”. After reading the collected studies (3477) only those that fulfilled the inclusion criteria were selected, resulting in a total of 32 studies. When considering the use of the PSQI, depression and anxiety influenced the quality of sleep as a whole and in its specific components. Also, it was found that sleep quality is associated mostly with socio-economic status and sociodemographic factors in non-clinical populations, and with psychosocial characteristics and disease outcomes in clinical-populations. In conclusion, we highlight the need of further research on how sleep quality, depression and anxiety relate and on the moderating and mediating effect of other variables, i.e., psychosocial, sociodemographic indicators, and socioeconomic status, on this relationship, in different populations.

Keywords: Literature review, PSQI, Sleep quality, Depression, Anxiety

Introduction

The complexity of sleep behaviour and its essential relation with quality of life is a matter of deep interest to science. Over the years the increasing need to assess which factors strongly influence the quality of sleep has grown (Becker, de Neves Jesus, João, Viseu, & Martins, 2015) and although it is now possible to describe and interpret many of its' biological mechanisms (Carter et al., 2012) and processes that lead to a good quality of sleep (Miró, Cano-Lozano, & Buela-Casal, 2005), much more has to be analysed in relation to sleep functions and outcomes.

Poor quality of sleep is essential for prime cognitive and psychological functioning (Waters & Bucks, 2011) and it may result on health impairments as, day time fatigue, mood disturbances, impaired memory and concentration (Colagiuri et al., 2011). Sleep disorders disrupt personal, family or social lives as well as damage professional productivity and increase the risk of accidents, health, welfare costs (Kyle, Morgan, & Espie, 2010), and mortality risk (Buysse, Germain, & Moul, 2005).

Sleep quality is a multidimensional concept and self-report retrospective and prospective questionnaires like Pittsburgh Sleep Quality Index (PSQI) have been created to analyse subjectively sleep quality and its outcomes in clinical and non-clinical populations (João, Becker, de Jesus & Martins, 2017). This instrument provides an accurate picture of seven different aspects of sleep and can identify potential sleep dysfunction (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989).

Previous studies have observed the associations between loneliness, grief, hostility, impulsivity, stress, depression anxiety and sleep (Baglioni, Spiegelhalder, Lombardo, & Riemann, 2010; Cho et al., 2013; Gallagher, Phillips, & Carroll, 2010; Okun, Tolge, & Hall, 2014). Thus, sleep quality and emotion are related. Depression and anxiety are some of the most common psychological distress symptoms encountered in clinical and non-clinical populations. As well, sleep disturbances are prevailing in society (Åkerstedt & Nilsson, 2003), therefore the importance of understanding the relationship between these and sleep quality.

Major depression has been ranked as one of the most burdensome disorders worldwide in terms of disability-adjusted life years (Üstün, Ayuso-Mateos, Chatterji,

Mathers, & Murray, 2004). In the past decade, large-scale studies have established that depression is a highly comorbid condition. Major depression and dysthymic disorder frequently co-occur with each other and with other mental disorders in the general population (ESEMeD/MHEDEA 2000 Investigators, 2004; Kessler, Chiu, Demler, & Walters, 2005; Mergl, Seidscheck, Allgaier, Möller, Hegerl, & Henkel, 2007). Depression also frequently co-exists with chronic somatic illnesses (Nuijen, 2009).

Other studies have analyzed the association between depression and sleep quality. Between 50 and 90% of subjects diagnosed with depression complain of poor sleep quality (Hetta, Rimon, & Almqvist., 1985; Riemann, 2014); other studies have demonstrated strong associations between insomnia and major depression (Tsuno, Besset, & Ritchie, 2005; Moos, 1999). While insomnia has been broadly considered as a major factor affecting the course of depression, there are data suggesting that it is similarly a risk factor for the development of depression (Breslau, Roth, Rosenthal, & Andreski, 1996; Chang, Ford, Mead, Cooper-Patrick, & Klag, 1997; Ford & Kamerow, 1989; Roberts, Shema, Kaplan, & Strawbridge, 2000).

Similarly, anxiety is one of the most prevalent psychological distress symptoms in our society (Kessler, Berglund, Demler, Jin, & Walters, 2005). Analysis of large prevalence studies of psychiatric illnesses in the US find that anxiety disorders afflict 15.7 million people in the US each year, and 30 million people in the US at some point in their lives. The economic costs of anxiety disorders include psychiatric, non-psychiatric, and emergency care; hospitalization; prescription drugs; reduced productivity; absenteeism from work; and suicide (Lépine, 2002). Sleep quality has been associated as well to anxiety disorders (Papadimitriou & Linkowski, 2005; Mellman, 2006). The National Comorbidity Survey Replication identified a prevalence rate of 32, 5% for comorbid sleep problems and anxiety disorders (Roth, Jaeger, Jin, Kalsekar, Stang, & Kessler, 2006).

Considering the comorbidity between depression and anxiety (Brown, Campbell, Lehman, Grisham, & Mancill, 2001), and the relationship between these mental health indicators and sleep quality we decided to hypothesize about their association. Hence, our aim is to review the studies on the association between sleep quality, depression and anxiety, using the PSQI, one of the main self-report instruments on sleep evaluation, in order to understand how these constructs relate.

Method

This review was conducted in Feb 2016 in the electronic databases Web of Science (WoS) and EBSCO which were efficient tools to find the necessary heterogeneity for the selection of the relevant studies. The key words used were "sleep quality", “depression” and “anxiety”. The research was divided into phases (Figure 1): (a) 3477 references were found using the previously chosen keywords; (b) considering the use of two research sources, some studies were repeated and, therefore, excluded, resulting in 1878 articles; (c) the relevance of the studies was based in the following criteria: (c1) full text studies published in scientific journals; (c2) empirical study; (c3) the use of the Pittsburgh Sleep Quality Index (PSQI); and (c4) English, Spanish, Portuguese and French as publication languages. Thus, after this phase, the number of studies registered was 125; (d), after reading the abstracts we considered only studies that: (d1) have the presence of enough data to analyse “what has been studied” and “how it was studied”, 52 studies were left; and in this last phase after reading the articles (e) only studies that were composed by adult samples; which resulted in 32 articles.

After the fifth phase (i.e., phase e), the 32 selected studies were assessed regarding the following information: (a) authors; (b) year of publication; (c) type of sample; (d) instruments used; and (e) obtained results. The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-analyses) will be applied in the method of selection and classification of the studies in review.

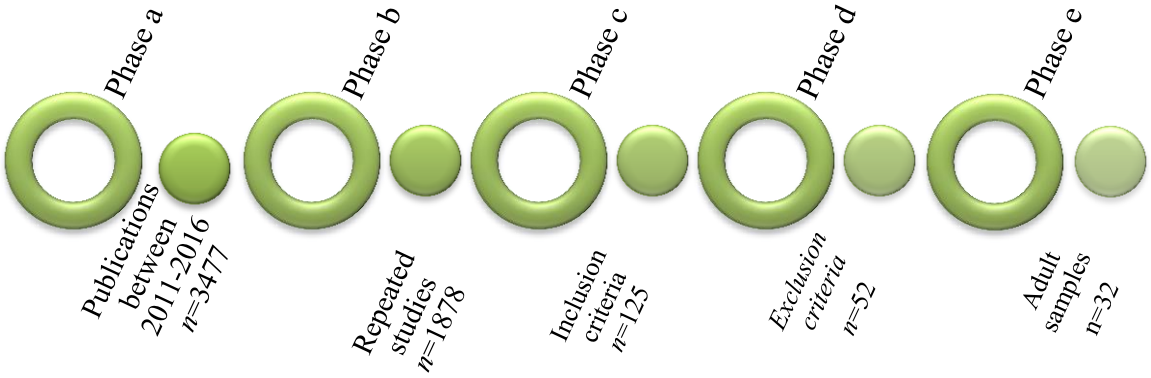

Figure 1. Phases of the literature review. In each phase are presented the number (*n*) of studies that remained in the sample.

Results

The theoretical perspective was confirmed by a selection of studies with identical subjects (i.e., adults). The characterization of the "sleep" variable had the same approach, although there are some differences regarding sleep quality. The "depression" variable was evaluated in all studies with the same approach. The "anxiety" variable was assessed in three different perspectives: (a) anxiety; (b) panic disorder; (c) social anxiety. The selection criterion was to not discriminate between these factors, since they all addressed different perspectives of anxiety and all rely on self-report methods. The methodological approach was common to all studies (i.e., quantitative approach) and pointed to works where the PSQI was the instrument used to evaluate sleep quality in adult samples.

Table 1 displays the authors, year of publication, type of sample and total number of participants. The total number of participants was 23. 683, the majority were females (17.721) while 5.395 were males. From the 32 studies, 25 have a prevalence of female participants, and from those Hsieh et al. (2011) with 630 female participants (about 95% of total participants) and Anaghi et al. (2013) with 202 female participants (about 75% of total participants) are the studies with the highest prevalence of female participants. Concerning the type of sample, eight of the studies comprise only women samples (Colagiuri et al., 2011; Kalmbach et al., 2014; Kasitanon et al., 2013; Miró et al., 2011; Mungía-Izquierdo & Legaz-Arrese, 2012; Blumel et al., 2012; Palagini et al., 2014; Vitkova et al., 2014), twenty-one studies include clinical samples, and eleven studies analyze non-clinical samples (these studies are identified in Table 1).

Table 1. Articles Included in the Literature Review and Participant Characterization (N = 32)

Authors/year	Type of sample	*N*	
		Total	F/M
*Anders et al. (2013)	General population	3281	1817/1464
Annagür et al. (2014)	Chronic pain	162	119/43
Araghi et al. (2013)	Obesity	270	202/68
Batmaz et al. (2014)	Lumbar spinal stenosis	66	39/27
Belleville et al. (2011)	Post-traumatic stress disorder	55	38/17
*Benitez & Gunstad (2012)	Healthy young adults	67	43/24
*Blumel et al. (2012)	Mid-life women	6079	6079/0
*Castro et al. (2013)	General population	917	498/419
Colagiuri et al. (2011)	Primary breast cancer	3343	3343/0
Fairholme & Manber (2014)	Anxiety and depressive disorders	63	39/24
Fogelberg et al. (2012)	Traumatic brain injury	129	29/100
Hovland et al. (2013)	Panic disorder	36	29/7
*Hsieh et al. (2011)	Rotating sleep nurses	661	630/31
Kalmbach et al. (2014)	Young women	171	171/0
Kasitanon et al. (2013)	Systemic lupus erythematosus	56	56/0
Kushnir et al. (2014)	Social anxiety disorder receiving CBGT	63	22/41
*Markarian et al. (2013)	Undergraduate students	459	363/96
*Melo et al. (2016)	Psychiatry residents	59	22/37
*Mellor et al. (2014)	General simple	582	428/154
Miró et al. (2011)	Fibromyalgia	104	104/0
Moser et al. (2015)	Epilepsy	32	17/15
Mungía-Izquierdo & Legaz-Arrese (2012)	Fibromyalgia	66	66/0
Palagini et al. (2014)	Systemic lupus erythematosus	81	81/0

*Plumb et al. (2014)	Service members and veterans	375	-
Ponsford et al. (2013)	Traumatic brain injury	281	130/151
Romito et al. (2014)	Cancer patients	403	252/151
Saini et al. 2013	Cancer patients undergoing chemotherapy	173	79/94
Tian, Chen & Zhang (2014)	Cervical cancer patients	192	-
Vitkova et al (2014)	Multiple sclerosis	152	152/0
Wang et al. (2013)	Chronic haemodialysed patients	206	94/112
Wigg et al. 2014	Epilepsy patients	98	39/59
*Wong & Fielding (2011)	General population	5001	2740/2261
	Total	23683	17721/5395

Note. M = Male, F = Female.

*Non-clinical samples

Table 2 shows the main results of the studies conducted on sleep quality, depression and anxiety.

Table 2. Main Results of the Studies Conducted about Sleep Quality, Depression and Anxiety (N = 32)

Authors/year	Instruments	Results
Anders et al. (2013)	PSQI[1]; HADS[2]	Higher socioeconomic status (SES) predicted good sleep quality. Anxiety and depression, as well as physical diseases, are more frequent in persons with a low SES than in those with a medium or high SES.
Annagür et al. (2014)	HADS[2]; HDI[3]; Short Form- 36[4]; PSQI[1]	Psychiatric morbidity in patients with chronic pain is frequently seen and if these patients have any, more severe psychiatric disorder, sleep quality is

		damaged.
Araghi et al. (2013)	PSQI[1]; ESS[5]; IWQOL-Lite[6]; HADS[2]	Poor sleep quality, anxiety and depression symptoms, and reduced quality of life were highly prevalent among patients with severe obesity.
Batmaz et al. (2014)	VAS[7]; ODI[8]; PSQI[1]; HADS[2]	In patients with lumbar spinal stenosis sleep disturbance was associated with higher levels of pain, disability, depression, and anxiety.
Belleville et al. (2011)	PSQI[1]; MPSS-SR[9]; BDI[10]; BAI[11]; SF 12[12]	Significant improvements were observed on sleep quality, sleep onset, sleep efficiency and sleep disturbances of post-traumatic stress disorder patients after CBT although 6 months later the changes were not fully maintained .
Benitez & Gunstad (2012)	MMPI-2[13]; PSQI[1]; TMT-B[14]; ARCPT[15]	In healthy young adults it was proved that there is an association between poor sleep quality, depression and anxiety, and that poor sleep quality diminishes cognitive functioning independent of depression and anxiety.
Blumel et al. (2012)	PSQI[1]; AIS[16]; GADS[17]; MRS[18]; BSAD[19]	Insomnia and poor sleep quality were highly prevalent in this mid-life women sample in which vasomotor symptoms, depression and anxiety were associated to sleep disturbances.
Castro et al. (2013)	BDI[10], BAI[11]; ABEP[20]; UNIFESP-SQ[21], PSQI[1], ISI[22], WHOQOL-BREF[23], CFS[24],	The prevalence of depression was 10.9%. A combination of sleep-related symptoms and impaired quality of life was 2.5 times more frequent among depressed than non-depressed. Co-morbid insomnia and anxiety were

		positively associated to depressive symptomatology. There were no alterations in the polysomnography parameters, in either group.
Colagiuri et al. (2011)	PSQI[1]; CCI[25;] BDI-II[26]; Short Form-36[4]; PASE[27]	Most women with breast cancer experience sleep difficulty and the strongest and more consistent predictor of sleep difficulty was the presence of depressive symptoms.
Fairholme & Manber (2014)	PSQI[1]; MFI[28]; DBAS[29]; DASS[30]; SRBQ[31]; GSES[32]; NEO FFI[33]	In patients with anxiety and depressive sleep disorders sleep related safety behaviors and sleep efforts were significantly associated with sleep disturbance above and beyond trait vulnerabilities and state negative affect.
Fogelberg et al. (2012)	PHQ-9[34]; PSQI[1]; GAD-7[35]; DRS[36]; SWLS[37]	Traumatic brain injury patients commonly have complaints of poor sleep and these complaints are associated with other disorders has depression, anxiety and pain syndromes.
Hovland et al. (2013)	BSQ[38], ACQ[39], STAI-T[40], BDI-II[26], PSQI[1]	In patients with panic disorder neuropsychologically measured cognitive inhibition is related to key aspects of insomnia symptomatology independent of depression. Depression was positively related to the PSQI index.
Hsieh et al. (2011)	PSQI[1], STAI[41]	The prevalence of insomnia disorder was 59% (n = 390). Poor sleepers are more likely to have higher anxiety, feelings of depression, and a poor

		working atmosphere. Anxiety, depression, and working atmosphere are independent predictors of insomnia.
Kalmback et al. (2014)	CESD[42], STAIXS[43], PANAS-X[44], PSQI[1]	Consistent with past research, it was found evidence in support of a bidirectional relation between sleep and daily affect. Notably, these relations were robust to the influences of baseline symptoms of depression and anxiety.
Kasitanon et al. (2013)	SLEDAI-2K[45]; PGA[46]; PSQI[1]; SLEQOL-TH[47], FACIT[48]; VAS[49]; HAM-A[50]; HAM-D[51]	Treatment of sleep disturbance in systematic lupus erythematosus patients comorbid with depression not only improved depressive and anxiety symptoms but also improved sleep quality and quality of life of patients over time.
Kushnir et al. (2014)	PSQI[1], LSAS[52]; BDI[10]; SDS[53]	Subjective insomnia was associated with social anxiety disorder (SAD) even after controlling for depression severity; additionally the results demonstrated that depression severity is positively associated with SAD. As well CBT targeting anxiety had limited impact on sleep difficulties.
Markarian et al. (2013)	DASS-21[54]; BIS/BAS[55]; DERS[56]; PSQI[1]	Behavioral inhibition system (BIS) and behavioral activation system (BAS) reward sensitivity have an indirect effect on depression, anxiety and stress symptoms through emotional regulation difficulties (ERD), which are moderated by sleep quality.

Melo et al. (2016)	PSQI[1], ESS[5], BDI-II[26], BAI[11], SPIN[57]	Poor sleep quality is frequent in psychiatry residents and associated with anxiety and social phobia symptoms, but not with depressive symptoms. More importantly, bad sleep hygiene and use of hypnotics were common.
Mellor et al. (2014)	PSQI[1]; DASS-21[54]; BQ[58]	Sleep-related risk factors, such as gender, psychological symptoms, and risk of sleep-disorder breathing, although related to sleep quality, did not have an impact on the relation between age and sleep quality.
Miró et al. (2011)	MPQ[59]; PSQI[1] HADS[2]; CPSS[60]; IDF[61]	Women with fibromyalgia reported more pain, depression, and anxiety, and worse sleep quality, self-efficacy, and daily functioning than the control participants, as well poor sleep quality was associated with greater levels of pain, anxiety, and depression, and worse levels of self-efficacy and daily functioning.
Moser et al. (2015)	MMSE[62]; PSQI[1]; ESS[5]; BDI[10]; BAI[11]	Nonrestorative sleep was more prevalent in patients with partial epilepsy than the control group and depression was the best predictor for a poor subjective sleep quality and increased daytime sleepiness
Munguía-Izquierdo & Legaz-Arrese (2012)	FIQ[63]; PSQI[1]; LTPAI[64]; PAHWI[65]; STAI[41]; BDI-II[26]	Poor quality of sleep in patients with fibromyalgia compared with healthy subjects was mainly associated with the Fibromyalgia Impact Questionnaire (FIQ) score. This result is not

		surprising because the FIQ score is indicative of the severity of a variety of symptoms, including worsened physical function, anxiety, pain, fatigue, poor sleep quality, depression, stiffness and lack of well-being.
Palagini et al. (2014)	ISI [21]; PSQI[1]; BDI[10]; SAS[66]	It was found high prevalence of poor sleep quality and insomnia in a cohort of women with systemic lupus erythematosus (SLE) and it was suggested that depressed mood might play an important role in the pathogenesis of sleep disorders in SLE.
Plumb et al. (2014)	PSQI[1]; PCL-M[67]; PHQ-9[68]; GAD-7[32]	Sleep problems were common across the sample, with 89% of the sample being classified as "poor sleepers." Sleep problems were more severe among service members with less education, from lower ranks (E1-E3), with greater combat exposure, and greater depression, anxiety, and post-traumatic stress disorder (PTSD) symptoms.
Ponsford et al. (2013)	ESS[5]; PSQI[1]; GSQ[69]; HADS[2]; BPI[70]	In the TBI group presence of both anxiety and depression was associated with poorer sleep quality, increased napping, and greater daytime sleepiness, and in the case of depression, poorer sleep efficiency.
Romito et al. (2014)	PSQI[1]; HADS[2] ; QLQ-C30[71]; FACIT[72]; ECOG[73]	Sleep disturbances are a frequent symptom in cancer patients undergoing chemotherapy, they co-occur with many other disabling symptoms such

		as psychological distress, reduced physical functioning and reduced overall quality of life.
Saini et al. (2013)	PSQI[1]; IRLS[74]; FACT-G[75]; HADS[2]	It was found high prevalence of sleep disorders and restless legs syndrome (RLS) in cancer patients undergoing chemotherapy. RLS and sleep disorders were associated with worse quality of life and greater depression and anxiety.
Tian, Chen & Zhang (2014)	PNQ[76]; PSQI[1]; DT[77]; HADS[2]; MFI-20[78]; CSSQ[79]	The treatment (chemotherapy-induced CIPN and chemotherapy combined with radiotherapy) and psychological factors (distress, anxiety, and depression) were the main factors associated with poor sleep quality, whereas performing exercise during adjuvant therapy helped reduce the risk of poor sleep quality in patients.
Vitkova et al. (2014)	PSQI[1]; HADS[2]; MFI-20[79]; ISS[80]; SF-36[4] EDSS[81]	Prevalence of poor sleep is significantly higher in patients with longer multiple sclerosis disease duration (MS). The variables associated with poor sleep in the group with less duration of MS were anxiety, mental fatigue and reduced motivation while in the group of longer duration were pain, depression and mental fatigue.
Wang et al. (2013)	PSQI[1]; BDI-II[38]; BAI[11]	Morning dialysis shift, depression, anxiety and tea drinking were factors that independently and significantly predicted quality of sleep of

		hemodialysis patients.
Wigg, Filgueiras & Gomes (2014)	BDI[10]; BAI[11]; PSQI[1]; ESS[5]	Depression and anxiety were associated with sleep quality, daytime sleepiness, and suicidal ideation. Depression and sleep disturbance were good predictors of suicide in subjects with epilepsy.
Wong & Fielding (2011)	PSQI[1]; HADS[2]; SF-12[12]; THS[82]	Insomnia is highly prevalent in the general population of Hong Kong. Older age, lower income and lower education level generally conferred higher odds for having insomnia. Insomnia is associated with impaired mental health.

Note. [1]Pittsburgh Sleep Quality Index (PSQI); [2]Hospital Anxiety and Depression Scale (HADS) [3]Hamilton Depression Inventory (HDI); [4]Short-Form Medical Outcomes Questionnaire (SF-36); [5]Epworth Sleepiness Scale (ESS); [6]Impact of Weight on Quality of Life-Lite (IWQOL-Lite); [7]Visual analog scale (VAS); [8]Oswestry Disability Index (ODI); [9]Modified PTSD Symptom Scale- Self-Report (MPSS-SR); [10]Beck Depression Inventory (BDI); [11]Beck Anxiety Inventory (BAI); [12]Medical Outcome Survey-Short-Form 12 (SF 12); [13]Minnesota Multiphasic Personality Inventory-2 (MMPI-2); [14]Trailmaking Test part B (TMT-B); [15]Attention Adaptive Rate Continuous Performance Test (ARCPT); [16]Athens Insomnia Scale (AIS); [17]Goldberg Anxiety and Depression Scale (GADS), [18]Menopause Rating scale (MRS), [19]Brief Scale of Abnormal Drinking (BSAD); [20]Brazilian Criterion of Economic Classification (ABEP); [21]UNIFESP Sleep Questionnaire (UNIFESP-SQ); [22]Insomnia Severity Index (ISI), the [23]World Health Organization Quality of Life (WHOQOL-BREF); [24]Chalder Fatigue Scale (CFS); [25]Chralson Comorbidity Index (CCI); [26]Beck Depression Inventory II (BDI-II); [27]Physical Activity Scale for the Elderly (PASE);[28]Multidimensional Fatigue Inventory (MFI); [29]Disfunctional Beliefs and Attitudes about Sleep Scales (DBAS), [30]Depression Anxiety Stress Scale (DASS); [31]Sleep Related Behaviors Questionnaire (SRBQ); [32]Glasgow Sleep Effort Scale(GSES); [33]NEO Five Factor Inventory (NEO FFI); [34]Patient Health Questionnaire (PHQ-9); [35]Generalized Anxiety Scale (GAD-7), [36]Disability Rating Scale (DRS); [37]Satisfaction With Life Scale (SWLS); [38]Body Sensations Questionnaire (BSQ); [39]Agoraphobic Cognitions Questionnaire (ACQ); [40]State-Trait Anxiety Inventory- Trait version (STAI-T); [41]State-Trait Anxiety Inventory (STAI); [42]Center for Epidemiologic Studies Depression Scale (CESD); [43]State-Trait Anxiety Inventory Form X – State (STAIXS); [44]Positive and Negative Affect Schedule-Expanded form (PANAS-X); [45]Systemic Lupus Erythematosus Disease Activity Index 2000 (SLEDAI-2K); [46]Physician's Global Assessment (PGA); [47]Systemic Lupus Erythematosus Quality of Life Questionnaire Thai version (SLEQOL-TH); [48]Functional Assessment of Chronic Illness Therapy (FACIT); [49]Visual Analog Scale (VAS); [50]Hamilton Rating Scale for Anxiety (HAM-A); [51]Hamilton Rating Scale for Depression (HAM-D); [52]Liebowitz Social Anxiety Scale (LSAS); [53]Sheehan Disabilities Scale (SDS); [54]Depression Anxiety Stress Scale-21 (DASS-21); [55]Behavioral Inhibition System and Behavioral Activation System Scale (BIS/BAS); [56]Difficulties in Emotion Regulation Scale (DERS); [57]Social Phobia Inventory (SPIN); [58]Berlin Questionnaire (BQ); [59]McGill Pain Questionnaire (MPQ); [60]Chronic Pain Self-Efficacy Scale (CPSS); [61]Inventory of Impairment and Functioning (IDF); [62]Mini-mental State Examination (MMSE); [63]Fibromyalgia Impact Questionnaire (FIQ); [64]Leisure Time Physical Activity Instrument (LTPAI); [65]Physical Activity at Home and Work Instrument (PAHWI); [66]Self-rating Anxiety Scale (SAS); [67]PTSD Checklist–Military (PCL-M); [68]Patient Health Questionnaire-9 (PHQ-9); [69]General Sleep Questionnaire (GSQ); [70]Breef Pain Inventory(BPI); [71]Quality of Life Questionnaire (QLQ-C30); [72]Functional Assessment of Chronic Illness Therapy-Fatigue scale (FACIT); [73]Eastern Cooperative Oncology Group (ECOG); [74]International Restless Legs Syndrome Study Group Rating

Scale (IRLS); [75]Functional Assessment of Cancer Therapy- General (FACT-G); [76]Patient Neurotoxicity Questionnaire (PNQ); [77]Distress Thermometer (DT); [78]Multidimensional Fatigue Inventory (MFI-20); [79]Chinese Social Support Questionnaire (CSSQ); [80]Incapacity Status Scale (ISS); [81]Expanded Disability Status Scale (EDSS); [82]Thematic Household Survey 2002 (THS).

Sleep

Regarding the instruments, the authors used different options. Has inclusion criteria in all the studies selected for this review, the variable "sleep" was measured by the PSQI. Besides this questionnaire other self-report surveys were administered in some of the studies to measure, as well, sleep quality. From them, the one most administered was the Epworth Sleepiness Scale (Johns, 1991), in 5 studies, seconded by the Insomnia Severity Index (Bastien, Vallières, & Morin, 2001), in 2 studies. In only one study (Castro et al., 2013) it was considered the objective sleep quality measured by polysomnography assessment.

We emphasize the difference between self-response instruments and the ones' employed in clinical studies (polysomnography). This method (i.e., polysomnography) is used in medicine and measures different aspects of sleep and variables such as electroencephalography (EEG), eye movement, musculoskeletal activity, or electrocardiogram (ECG). We encountered one study which used this method (Castro et al., 2013) to assess objectively the sleep quality of the adult population of Sao Paulo, Brazil and its relationship with the prevalence of depression in this population.

Depression and Anxiety

Concerning the measures applied for the assessment of depression and anxiety, we highlight the use of the most used self-report questionnaire, the HADS (Zigmond & Snaith, 1983) used in eleven studies, to measure depression and anxiety, followed by the BDI (Beck, Ward, Mendelson, Mock, & ERBAUGH, 1961) and BDI-II (Beck, Steer, & Carbin, 1988) to measure only depression, in 10 studies. The BAI (Beck Epstein, Brown, & Steer, 1988) was used in 5 studies and the STAI (Spielberger, 1983) in 4 studies, to measure only anxiety.

The HADS (Zigmond & Snaith, 1983) assesses anxiety and depression symptoms in non-psychiatric hospital contexts over the past week. The HADS includes 14 items (grouped into anxiety and depression dimensions) that are assessed on a scale from 0 to 3. Each HADS subscale is scored between 0 and 21, with higher scores indicating greater morbidity. The BDI (Beck et al., 1961) and the BAI (Beck et al.,

1988) have 21 items that relate to symptoms of depression and anxiety, respectively. Each symptom is rated by the respondents on a 0–3 scale, with 0 representing "absence" and 1–3 representing increasing levels of symptoms severity.

In one of the studies included in this review the variable "anxiety" was considered as "social anxiety" (Kushnir et al., 2014) and Hovland et al. (2013) in their study measured "panic disorder". All the other studies had the same approach for the assessment of anxiety.

Discussion

The main objective of this literature review was to analyze the relationship between sleep quality, depression and anxiety, having sleep quality measured by the PSQI. All the studies included were based on sell-report ratings studying the subjective sleep quality, with the exception of one that analyzed, as well, the objective sleep quality through polysomnography. Our review showed that sleep quality, depression and anxiety are related.

Concerning the heterogeneity of the type of sample of the studies included, we observed that 21 studies had clinical samples and 11 studies had non-clinical samples. Therefore, many different aspects of sleep quality, depression and anxiety were discriminated, since different contexts and samples were included. Our review included samples with specific characteristics: (a) non-clinical population: (a1) soldiers, (a2) midlife women, (a3)undergraduate students, (a4) nurses, (a5) general population; (b) clinical population: (b1) chronic pain; (b2) obesity; (b3) lumbar spinal stenosis; (b4) anxiety and depressive disorders; (b5) cancer; (b6) chronic haemodialyzed patients; (b7) traumatic brain injury; (b8) fibromyalgia; (b9) epilepsy; (b10)multiple sclerosis; and (b11) syndrome of lupus erythematosus.

The choice of the PSQI as the instrument to be used in all the studies relied on its good clinimetric properties essential for the valid measurement of complex clinical phenomena as sleep quality. Moreover, this self-report survey has been widely used in clinical and non-clinical populations.

In our review, among the eleven studies that opted for non-clinical subjects it was found that lower social economic status on general population (Anders et al., 2013;

Wong & Fielding, 2011), lower education on soldiers and veterans, and general population (Plumb et al., 2014; Wong & Fielding, 2011), and age on general population (Wong & Fielding, 2011; Mellor et al., 2014) can predict poor sleep quality. As well, cognitive functioning on healthy young adults (Benitez & Gunstad, 2012), daily affect on young women (Kalmback et al., 2014), medication on psychiatry residents (Melo et al., 2016), vasomotor symptoms on mid-life women (Blumel et al., 2012), and poor working atmosphere on shifting nurses (Hsieh et al., 2011), are related to sleep quality. Mainly, socioeconomic and sociodemographic factors seem to predict quality of sleep in these group of non-clinical samples. These results agree with those of Soltani et al. (2012); in a cohort of 3655 Australian women, they assessed that lower income and lower education predicted poorer quality of sleep. Nevertheless, mixed findings are found when assessing the impact of sociodemographic variables as age and gender in the sleep quality. These discrepant results alert us to the necessity of more scrutinizing.

All these studies had consistent results that pointed out the relationship between sleep quality, depression and anxiety in non-clinical populations, with the exception of Melo et al. (2016). Their conclusions underlined the absence of influence of the variable depression in sleep quality, maybe due to the effect of moderator variables, although anxiety and social phobia proved to affect the quality of sleep of psychiatry residents. It is now a concern to understand how socioeconomic and sociodemographic factors moderate or mediate the relationship of these three variables.

As well, we found in our review that in patients with cancer the predictors of sleep quality were, physical functioning (Colagiuri et al., 2011; Romito et al., 2014), quality of life (Romito et al., 2014), restless legs syndrome (Saini et al., 2013), depression (Colagiuri et al., 2011; Romito et al., 2014; Saini et al., 2013; Tian et al., 2014;), anxiety (Romito et al., 2014; Saini et al., 2013; Tian et al., 2014), and, treatment and exercise (Tian et al., 2104). Considering the increasing prevalence of cancer in our society, the burdensome implications of treatment and illness symptoms, and how cancer patients have a higher risk of sleep problems (Savard & Morin, 2001) we are pressed to comprehend how these factors predict sleep quality in these subjects.

It seems that different factors predict sleep quality on clinical and non-clinical subjects. From the clinical samples encountered, in the ones with anxiety and depressive disorders, negative affect (Fainholme et al., 2013), cognitive inhibition and heart rate

variability (Hovland et al., 2013) are related to sleep quality, anxiety and depression. As well, these subjects tend to have worse sleep quality (Bellevive et al., 2011; Kushnir et al., 2014; Hovland et al., 2013; Fainholme., 2014) and to beneficiate from CBT (Bellevive et al., 2011; Kushnir et al., 2014), although CBT does not improve the quality of sleep (Kushnir et al., 2014). In consonance with other studies that have demonstrated the importance of incorporating sleep management strategies into the treatment of these disorders (Morin et al., 2006; DeViva et al., 2005) our outcomes direct for the importance of educating health care professionals on how to treat sleep difficulties independently of other comorbidities.

Moreover, in subjects with chronic pain, any mood, anxiety and somatoform disorder, as well as any substance use disorder, appear to be related to sleep quality and quality of life (Annagur et al., 2014). Studies with samples with other chronic pain disease (fibromyalgia and systemic lupus erythematosus) found that poorer sleep quality is associated with symptom severity and symptom duration, sedentary life style, depression and anxiety (Miró et al., 2011; Munguía-Izquierdo & Legaz-Arrese, 2012), worse levels of self-efficacy and daily functioning (Miró et al., 2011) in fibromyalgia; and, depressive symptoms (Kasitanon et al., 2013; Palagini et al., 2014) and immunosuppressive drug use (Palagini et al., 2014), in lupus systemic erythematosus. As well pain, disability, depression, and anxiety are related to sleep quality in patients with lumbar spinal stenosis (Batmaz et al., 2014), disease which has pain as the main symptom. Once more it is pointed out the weight of diseases- related symptoms, comorbidities and treatments in the sleep quality of subjects suffering with pain, thus, our results are in line with what has been previously reported in other studies (Chapman, Perry, & Strine, 2005; Clarke & Currie., 2009).

Similarly, for subjects with traumatic brain injury, pain, anxiety, and depression contributed significantly to poorer sleep quality (Fogelberg et al., 2012; Ponsford et al., 2013). Considering patients suffering of multiple sclerosis, longer disease duration, mental fatigue, depression, anxiety and reduced motivation are related with the quality of sleep (Vitkova et al., 2014). As well, depression appeared as the best predictor of sleep quality in patients with epilepsy (Moser et al., 2015; Wigg et al., 2015) also anxiety, moreover, depression and sleep quality are predictors of suicide in subjects with epilepsy (Wigg et al., 2015). Likewise, poor sleep quality, anxiety and depression symptoms, and reduced quality of life are highly prevalent among patients with severe

obesity (Arhaguir et al., 2013). In chronic haemodialyzed patients, morning dialysis shift, depression, anxiety and tee drinking are predictors of sleep quality (Wang et al., 2013). Although referring to different disorders the results are constant; in all of them depression, anxiety and other psychosocial variables are related to sleep quality, thus, there is a need to screen for sleep problems, and how these relate to mental health indicators, among clinical-populations.

When analyzing the relationship between sleep quality, depression and anxiety in clinical and non-clinical populations we found no difference, that is, there is an association between these variables in both groups. However, we encountered some differences on the type of variables that seem to have an effect on this association. If on one hand we have mainly the presence of socioeconomic and sociodemographic factors influencing this relation on non-clinical populations, on the other hand, with clinical populations, the evidence came mostly from psychosocial variables and outcomes related to the illness itself, as, comorbid symptoms, pain, treatment, and use of medication (among others).

Understanding how sleep quality, depression and anxiety relate can play an important role on improving quality of life of clinical and non-clinical populations. Accordingly, we highlight the importance to continue the research on this relationship and on other variables, i.e., psychosocial, sociodemographic indicators, and socioeconomic status, should they have a moderator and mediator effect on this relationship.

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4. Estudo 3: “Validation of the Portuguese version of the Pittsburgh Sleep Quality Index (PSQI-PT)”

João, K. A. D. R., Becker, N. B., de Neves Jesus, S., & Martins, R. I. S. (2017). Validation of the Portuguese version of the Pittsburgh Sleep Quality Index (PSQI-PT). *Psychiatry Research*, 247, 225-229.

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Abstract

The present study was realized to validate the Portuguese version of the PSQI. The instrument PSQI-PT was applied to 347 Portuguese community-dwelling adults aged 18-69 years old. The resulting data was used to perform the psychometric analysis to validate the instrument. No structural modifications to the questionnaire were necessary during the adaptation process. The scores for the PSQI-PT showed an adequate internal consistency. The principal component analysis (PCA) produced good factor loading for all items. Finally, the analysis of demographic variables showed that age and literacy influence the values for the "Global Sleep Quality" (GSQ) in this Portuguese sample. In conclusion, this study demonstrated that the PSQI-PT is a valid and reliable instrument for the assessment of sleep quality with the advantage of allowing community-dwelling adults differentiation between good and poor sleepers.

Keywords: Sleep quality, Pittsburgh Sleep Quality Index, Portuguese validation, Community-dwelling adults.

Introduction

Sleep is a complex and dynamic behavioural state that greatly influences our waking hours and contributes to the body´s physical and mental recovery. Sleep disturbances currently prevail in society (Akerstedt & Nilsson, 2003). The most common sleep disorders are, namely, insomnia, restless legs syndrome, obstructive sleep apnea syndrome and shift wake–sleep disorder. These are some of the main health complaints of clinical and non-clinical populations. In western countries the rates of self-reported insomnia range between 10 and 48% (Ford & Kamerow, 1989; Mellinger, Balter, & Uhlenhuth, 1985; Ohayon & Paiva, 2005; Ohayon & Smirne, 2002). In Portugal, 28,1% of the population of 18 and more suffer from insomnia symptoms at least three nights a week (Ohayon & Paiva, 2005). The United Kingdom has up to one-third of adults living with some sleep disturbance (Ohayon, Caulet, Priest, & Guilleminault, 1997) and in the USA more than 60 million (Chilcott & Shapiro, 1996).

Sleep disturbances are frequently associated with other health impairments as, daytime fatigue, mood disturbances, impaired memory and concentration (Colagiuri, Christensen, Jensen, Price, Butow, & Zachariae, 2014a). There are other studies that relate poor sleep quality and psychiatric disorders (Baglioni et al., 2014a; Baglioni et al., 2014b), cancer (Colagiuri et al., 2011b; Fortner ,Stepanski, Wang, Kasprowicz, & Durrence, 2002; Savard & Morin, 2001) and diabetes (Buxton et al., 2012; Pan, Schernhammer, Sun, & Hu, 2011; Reutrakul et al., 2013). Daytime sleepiness has been associated with increased risk of motor vehicle accidents, worse physical health, and increased mortality risk (Buysse, Germain, & Moul, 2005). Thus, poor sleep quality and insomnia symptoms are associated not only with worse mental and physical health but as well with increased absenteeism from work and health care costs and utilisation. The cost estimates regarding sick days, treatment and other impacts on society are considerable (Léger, Guilleminault, Bader, Lévy, & Paillard, 2002). On the basis of data from the American Institute of Medicine (IOM), hundreds of billions of dollars per year are spent on direct medical costs related to sleep disorders (Reis, 2014).

Sleep can be assessed across self-report, behavioural, physiological, circuit, cellular, and genetic levels of analysis (Buysse, 2014) by using quantitative parameters such as sleep duration, sleep latency and number of awakenings, and qualitative parameters which are merely subjective (Bertolazi, Fagondes, Hoff, Dartora, Miozzo, de Barba, & Barretet, 2011). Polysomnography and/or electroencephalographic spectral content analysis obtain objective measurements of sleep quality although they demand

an extensive time commitment from patients and financial effort for researchers (Hita-Contreras, Martínez-López, Latorre-Román, Garrido, Santos, & Martínez-Amat, 2014).

Haponik et al. (1996) realised in their study that no physician of primary care investigated for sleep disorders, though once they were trained on the disease, 82% of them started investigating it. Lack of information on sleep disorders in primary care medicine (Papp, Penrod, & Strohl ,2002) and the difficulty in assessing objective and subjective sleep quality may represent some of the limitations encountered to understand the reality of sleep health. The use of a well-developed scale can facilitate the diagnosis of sleep disturbance at an early stage, therefore, enhancing the chances of prevention, recovery and diminishing concomitant outcomes.

Sleep quality is a multidimensional concept that includes individual components such as satisfaction with sleep, sleep efficiency, and impact on daytime functioning (Magee, Caputi, Iverson, & HUANG, 2008), thus, self-report retrospective and prospective questionnaires have been created to analyze subjectively sleep and its outcomes in clinical and non-clinical populations. These questionnaires can be used for clinical purposes, to aid on treatment responses, in clinical research and epidemiological studies (Bertolazi et al., 2011).

The Pittsburgh Sleep Quality Index is a 19-item self-rated questionnaire for evaluating subjective sleep quality in general and clinical populations over the previous month. Initially, it was developed for clinical populations with the purpose to provide a reliable, valid, standardised measure of sleep quality and to discriminate "good" and "poor sleepers" providing an easy questionnaire for patients to complete and for clinicians and researchers to interpret (Buysse, Reynolds, Monk, & Berman, 1989). Aiming to overstep some of the several difficulties that other sleep questionnaires shared, Buysse et al. (1989) pretended to develop an instrument with good clinimetric properties essential for the valid measurement of complex clinical phenomena (Feinstein, 1987), as sleep quality. This questionnaire has been translated into 48 languages and has been used in a wide range of population-based and clinical studies (Buysse et al., 2008; Buysse et al., 1989). It is easily understood, and it takes 5 to 10 minutes to be answered. It has been widely used to measure sleep quality in general population and, as well, in clinical groups, such as groups with psychiatric disorders (Baglioni et al., 2014a; Baglioni et al., 2014b), cancer (Colagiuri et al., 2011b; Fortner et al., 2002; Savard & Morin, 2001), respiratory diseases (Foley, Ancoli-Israel, Britz, &

Walsh, 2004), fibromyalgia (Miró, Martínez, Sánchez, Prados, & Medina, 2011; Moldofsky, 2002).

As seen above, the Portuguese reality on sleeping difficulties outcomes is not that different from other western countries. The use of a well-designed self-report questionnaire as the PSQI can provide consubstantial information on the Portuguese actuality on sleep disorders and their effects. The PSQI was developed in 1988 and is the most commonly used generic measure in clinical and research settings (Mollayeva et al., 2016). It was validated for the Brazilian Portuguese spoken population in 2010 (Bertolazi et al., 2011). Until this day, to our knowledge, no other study has been made to validate the PSQI in Portugal. Although Brazil and Portugal share a common language, the fact is that there are cultural differences that need to be taken into account when trying to understand sleep effects. The adaptation and validation of any instrument need a cultural fit, that is, the instrument should be prepared to use in different cultural contexts (Beaton, Bombardier, Guillemin, & Ferraz, 2000; Hambleton, 2005; Sireci, Yang, Harter, & Ehrlich, 2006).

Buysse (2014) later on in his research suggested the possibility of using the PSQI in non-clinical populations, aiming for more normal results. As well Mollayeva, Thurairajah, Burton, Mollayeva, Shapiro, and Colantoni (2016), in their review focused the importance of assessing the quality of this test in non-clinical populations. Their results confirmed that in non-clinical and clinical samples with known differences in sleep quality, the PSQI global scores, and all subscale scores, with the exception of sleep disturbance, differed significantly. The fact that we chose a non-clinical sample can represent a step forward in clinical and non-clinical populations' prevention of sleep disorders as well as a tool for diagnosis and following treatment. Buysse (2014), highlighted the need to shift the focus of healthcare organisations from delivering health care to improve health. The present study was carried out to validate the PSQI for use in Portugal in a sample of Portuguese community-dwelling adults.

Methods

Pittsburgh Quality Sleep Index

The PSQI assesses sleep quality over a one-month period. The questionnaire consists of 19 self-related questions and five (5) questions that should 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 as well as reported in this article. The 19 self-related questions are categorised into seven (7) components, graded on a score that ranges from 0 to 3. 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 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).

Translation

The PSQI was translated to European Portuguese by two independent and bilingual translators, who were aware of the study objectives. Then, these two versions were synthesised with comparisons and analysis of their semantic, idiomatic, contextual and linguistic discrepancies obtaining a single version. The synthesised version was evaluated as the structure, the layout, the instrument's instructions, scope and appropriateness of expressions contained in the items. This procedure has tried to ensure the generalisation of the terms and expressions for different contexts and populations. In order to assess the clarity and generalization power of the items between the translation and original questionnaire, the PSQI-PT was applied in 20 individuals.

Sample

This study used a cross-sectional descriptive design. The instrument, PSQI-PT, was applied in a convenience sample of 347 Portuguese community-dwelling adults aged 18-69 years old, and all had Portuguese as a native language. For each person data regarding age (M=35.93 SD±11.01), sex (114 Female % and 233 Male), and literacy (2 did not have the basic scholarship completed, 52 had the basic scholarship completed, 148 held bachelor's degrees, and 145 held Master's and PhD degrees) were recorded.

The application process occurred online, via email, where the participants were informed about the research objectives. Only questionnaires from participants over 18 years old and having Portuguese as their native language were considered. The collected sample was part of a contact database designed through previous research projects of a Portuguese Research Center. This database was created in 2013 as representative of the

adult population in Portugal. In order to reach the highest number of participants as possible, the contacted respondents were asked to forward the received email to their contacts. All people who participated in this research accepted by free consensus to answer the questionnaire.

Statistical analysis

A total of 347 questionnaires were completed and checked for data entry errors, missing data, or presence of major outliers. An item analysis was performed according to a previously published protocol (Buysse et al., 1989). PSQI item responses were scored into seven different components, which had small amounts of missing data, with no more than 5% missing data for any composite. The single-point multiple imputation procedures for missing data replacement (Schafer & Graham, 2002) was conducted for the missing points.

Given the nature of the variant and nonlinear transformations from item responses into component scores, statistical analysis was conducted on the component scores. The descriptive statistics (means and standardised derivation) for each component of the PSQI and its correlations were calculated. The central characteristic of a construct is that its indicators co-vary with each other (Buysse et al., 1989). Then, we detected patterns among correlations indicating possible dimensions among the components scores. Internal consistency of PSQI-PT was assessed by Cronbach's α statistics.

Principal components analysis (PCA) was validated for the PSQI-PT components through the Kaiser-Meyer-Olkin Test (KMO > 0.5) and Bartlett's test of sphericity (rejection of null hypothesis), to verify the correlations between data (Moita-Neto, 2009). Afterwards, it was applied the PCA technique to check the capacity of reduction of the components of the sleep quality in a unique measure, as originally proposed in the instrument evaluation (Buysse et al., 1989). Data was analysed by the Statistical Package for the Social Sciences for Windows (SPSS), version 21.0.

Ethical aspects

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

Results

Structural-adaptation

No structural modifications to the questionnaire were necessary during the cross-cultural adaptation process. All items were understandable and clear for a previous group of 20 people who were asked about the items.

Characteristics of the participants and their respective PSQI-PT scores

The total sample was concluded with 347 Portuguese community-dwelling adults aged 18-69 years who completed the questionnaire and were included in the study. The descriptive characteristics and its correlations are listed in Table 1. The 7-component score of the PSQI-PT had an overall reliability coefficient (Cronbach's α) of 0.70, indicating an adequate degree of internal consistency.

Table 1. Descriptive statistics and correlations.

	N	%	Mean	SD	GSQ (M ±SD)	r[a]	Distribution GSQ (P-value)
Age (years)			35.93	11.01		-0.18*	
18-27	87	25.10			6.78 ±3.10		
28-35	90	25.90			5.32 ±2.39		0.001[b]
36-45	107	30.80			5.34 ±2.38		
>46	63	18.20			5.35 ±2.30		
Sex						0.07	
Female	114	32.90			5.44 ±2.35		0.283[c]
Male	233	67.10			5.82 ±2.76		
Literacy						-0.14*	
Basic scholarship incomplete	2	0.60			5.50 ±0.71		
Basic scholarship completed	52	15.00			6.27 ±2.43		0.02[b]
Bachelor's degree	148	42.70			5.95 ±2.74		
Master's and PhD degrees	145	41.80			5.24 ±2.55		

	1	2	3	4	5	6	7	GSQ
1. Subjective sleep quality	-							
2. Sleep latency	0.03	-						
3. Sleep duration	0.03	0.25*	-					
4. Habitual sleep efficiency	0.04	0.27*	0.37*	-				
5. Sleep disturbances	0.22*	0.27*	0.10*	0.15*	-			
6. Use of sleep medication	0.18	0.14*	-0.01	0.02	0.12*	-		
7. Daytime dysfunction	0.41	-0.00	0.08	-0.06	0.08	0.17*	-	
Global Sleep Quality (GSQ)	0.54*	0.61*	0.52*	0.46*	0.47*	0.47*	0.47*	-

Mean	1.23	1.13	0.59	0.24	1.20	0.28	1.12	5.70
SD	0.79	0.98	0.77	0.69	0.46	0.78	0.72	2.63

*Correlation is significant at the 0.05 level (2-tailed)
[a]Correlation with global sleep quality (GSQ)
[b]Kruskal-Wallis test
[c]Mann-Whitney U test

This sample may be considered young/adult, most of the participants are between 18-45 years old (M=35.93 ± 11.01), mostly male (67.1%) and with a high level of education (84.5% with a degree or post-graduation). The correlations coefficients of the seven components of the PSQI and the total score (GSQ) showed correlations of ≥0.46. Meanwhile, the correlations between components did not prove to be significant among themselves in all the cases. This happens due to the nature of the measurements of each component (Buysse et al., 1989). Thus, it is possible to understand that a global measurement for the PSQI presents significant correlations between all the components of the instrument, therefore, indicating the possibility of one unique dimension measurement that correlates strongly with all the other components.

The distribution of GSQ data related to the demographic information of this sample has proved, through the normality test Shapiro-Wilk the rejection of the null hypothesis; thus, data present a non-normal distribution of the global sleep quality. Therefore it is necessary the use of non-parametric tests to verify if there is the difference in the distribution of the GSQ values for the demographic categories. In this case, the Portuguese sample presents difference in the global sleep quality related to age and literacy. Considering that this difference is significant for the demographic variables, the regression analysis has demonstrated that age (β= -0.160; t= -2.990; p=0.003) and literacy (β= -0.132; t= -2.46; p=0.014) are significant predictors of the GSQ in the Portuguese population.

Principal components analysis (PCA) was validated for the PSQI-PT components through the Kaiser-Meyer-Olkin Test (KMO = 0.59) and Bartlett's test of sphericity that rejected the null hypothesis (p<0.001), which are adequate values (Moita-Neto, 2009) to analyse the sleep quality components data. Afterwards, it was applied the PCA technique to verify the capacity of reduction of the components of the sleep quality in one unique measure, as originally proposed in the instruments evaluation (Buysse et al., 1989). Table 3 shows the principal component analysis (PCA) results for PSQI.

Table 2. Principal component analysis for PSQI-PT

PSQI Components	Factor 1
1. Subjective sleep quality	0.500
2. Sleep latency	0.608
3. Sleep duration	0.547
4. Habitual sleep efficiency	0.547
5. Sleep disturbances	0.586
6. Use of sleep medication	0.376
7. Daytime dysfunction	0.389
Variance explained (%)	26.472

Discussion

The present study was carried out to validate the PSQI for application in Portugal in a sample of Portuguese community-dwelling adults. The scores for the PSQI-PT, measured by Cronbach's α coefficient components, showed an adequate internal consistency for each of the seven components of the questionnaire that assesses a particular aspect of sleep quality. Similar internal consistencies were obtained by other studies in other languages (Beaudreau et al., 2012; Magee et al., 2008; Mariman, Vogelaers, Hanoulle, Delesie, Tobback, & Pevernagie, 2012; Nicassio, Ormseth, Custodio, Olmstead, Weisman, & Irwin,l 2014; Rener-Sitar, John, Bandyopadhyay, Howell, & Schiffman, 2014; Skouteris, Wertheim, Germano, Paxton, & Milgrom, 2009; Spira et al., 2012). The application of the questionnaire to 20 people demonstrated no structural modifications to the questionnaire were necessary during the adaptation process. The PSQI-PT showed adequate psychometric proprieties which allow its application to community-dwelling adult participants, such as the ones assessed in the present study.

This validation has a particular characteristic; the sample is not a clinic one. Thus, the focus of our study is consistent with an increasing emphasis on promoting health rather than simply focusing on disease, in other areas of medicine (Buysse, 2014). This option was taken with the aim to find new directions for the research of more "healthy" samples in order to get more "normal" values. It is essential to research and obtain new knowledge on the healthy functioning of people in the general community, regarding sleep. Buysse (2014), emphasises that the current sleep medicine delivery system focuses on sleep testing and sleep disorders, however, what people may want is better sleep; and to achieve this, it is necessary to create new methods to assess

sleep health status in the community and to provide targets for intervention. This was our purpose when using this specific sample. Therefore, it is not consistent to compare these results with the other validation studies with clinic samples.

The present data are consistent with previous findings, in that shows low mean values to PSQI and components (Grandner et al., 2006). This sample showed significant means differences in the global sleep quality for the categories age and literacy, indicating the influence of these variables in the GSQ. Buysse et al. (1991) obtained similar age findings in their study where significant age effects were noted for the GSQ score and several component scores. Other studies, as well, yielded significant differences between education categories for the GSQ score (Adib-Hajbagher, Izadi-Avanji, & Akbari, 2012; Beaudreau et al., 2012). Through the regression analysis, it was possible to confirm that these demographic variables are significant predictors of the GSQ in this sample. Thus, we need to consider the influence of age and literacy for the measurement of GSQ in the Portuguese population.

The principal component analysis (PCA) for PSQI-PT with a single-factor model fit, as originally proposed in the instruments evaluation (Buysse et al., 1989), produced good factor loading for all items. The sub-scales "use of sleeping medication (SM)" and "daytime dysfunction (DD)" had low factor loading similarly to previous studies using factor analysis that reported low factor loading for the SM sub-scale (Babson, Blonigen, Boden, Drescher, & Bonn-Miller, 2012; Magee et al., 2008; Cole, Motivala, Buysse, Oxman, Levin, & Irwin, 2006; Tomfohr, Schweizer, Dimsdale, & Loredo, 2013) and for the DD sub-scale (Nicassio et al., 2014).

The PSQI developers' construct of "sleep quality" was defined based on clinical judgment alone (Mollayeva et al., 2016). Nevertheless, it covers a broad range of indicators relevant to sleep quality that can be used effectively in a non-clinical population allowing the PSQI application in preventive level interventions. Mollayeva et al. (2016) in their review concluded that in non-clinical and clinical samples with known differences in sleep quality, the PSQI global scores, and all subscale scores, with the exception of sleep disturbance, differed significantly. These results are consistent with ours.

The importance of this approach has already been made before by Buysse (2014), nowadays the health of populations is increasingly measured by positive attributes as wellness, performance, adaptation and not just by the absence of disease, thus sleep health can be defined in such terms. The same way, the investment in

educating primary care physicians and specialists on the importance of sleep health can facilitate early diagnosis and even prevent sleep disorders and its outcomes (Haponik et al., 1996; Papp et al., 2002). Therefore, using a well-designed instrument to assess subjective sleep quality, as the PSQI, can increment the awareness on the real impact of the sleep quality in the populations' quality of life.

The results of the present study demonstrated that the PSQI-PT is a valid and reliable instrument for the assessment of sleep quality. These outcomes are consistent with those of other studies. The PSQI-PT it is easy to understand and answer, and it provides the advantage of allowing adults´ community-dwelling differentiation between good or poor sleepers. Therefore, the PSQI-PT is useful for the subjective sleep quality assessment of clinical and non-clinical populations.

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5. Estudo 4: "The impact of sleep quality on the mental health of a non-clinical population"

João, K. A. D. R., de Jesus, S. N., Carmo, C., & Pinto, P. (2018). The impact of sleep quality on the mental health of a non-clinical population. *Sleep Medicine*, 46, 69-73. DOI: https://doi.org/10.1016/j.sleep.2018.02.010

Abstract

Sleep quality relates to mental health in clinical and non-clinical populations. However, there is more evidence of this relationship in clinical populations. Therefore, there is lack of evidence on how these variables relate and on which sociodemographic factors influence this relationship in non-clinical populations. In this study we hypothesize that in a non-clinical population sleep quality predicts mental health indicators and that age, country and gender moderate this relationship. In a sample of 1552 subjects from Portugal, Spain and Brazil, self-reported sleep quality and mental health indicators were assessed through the Pittsburgh Sleep Quality Index and the Depression, Anxiety and Stress Scale-21, respectively. A multivariate linear regression model was used to test the research hypotheses. This adjusted model explained 10.1%, 12.3% and 13.1% of the variability of Depression, Anxiety and Stress, respectively, suggesting multiple sources of variance. Our results confirmed that sleep quality predicts mental health in non-clinical populations, and that the variable country is a significant moderator of this relationship.

Keywords: Sleep quality, Mental health, Non-clinical populations.

Introduction

Sleep is a biological periodic state of mind and body critical to the maintenance of mental and physical health. Since the classic rats experiments conducted by Rechtschaffen, Bergmann, Everson, Kushida, and Gilliland (1989) sleep knowledge has evolved greatly in the last 30 years. The fact that the rats died after been deprived from sleeping alerted the scientific community for the importance of understanding sleep and its effects. In 2014 the International Classification of Sleep Disorders (ICSD), had already listed more than 70 sleep-related disorders (American Academy of Sleep Medicine, 2014). Literature has analyzed the prevalence of these disorders across the world evidencing that currently they are highly prevalent in society. Léger and coworkers (Leger, Poursain, Neubauer, & Uchiyama, 2008) in their international omnibus survey with 10.132 individuals (≥5 years old), assessed that the prevalence of sleeping problems was 56% in the USA, 31% in Western Europe (France, Germany, Italy, Spain and the UK) and 23% in Japan.

Likewise, in Brazil the incidence of sleep problems is high, in a study with 2017 randomly selected individuals from 132 different cities, 76% of them suffered from at least one sleep complaint (Hirotsu, Bittencourt, Garbuio, Andersen, & Tufik, 2014). As well, in Portugal, more than 28% of the population of 18 and more suffer from insomnia symptoms at least three nights a week (Ohayon & Paiva, 2005). Nevertheless, some authors have proposed that different countries experience these sleep difficulties through different patterns of sleep, highlighting how cross-cultural contexts influence sleep behavior and perspective (Airhihenbuwa, Iwelunmor, Ezepue, Williams, & Jean-Louis, 2016; Bin, Marshall & Glozier, 2012; Gildner, Liebert, Kowal, Chatterji, & Snodgrass, 2014; Wothman & Brown, 2013) thus suggesting that "culture" could relate to some aspects of sleep quality. Airhihenbuwa et al. (2016) define culture as *"the shared values, norms, and codes that collectively shape a group's beliefs, attitudes, and behavior through their interaction in and with their environments"*. Thus, belonging to a certain country, within the same geographical boundaries and climate (Giosan, Fuller, Nicoll, Flad, & Clift, 2013) sharing values (Airhihenbuwa et al., 2016) and a language (Kramsch, 1998) shapes the cultural context in which sleep occurs. As some studies have evidenced sleep aspects as duration of sleep (Bin et al., 2012; Gildner et al., 2014), co-sleeping and napping (Wothman & Brown, 2013), and sleep quality (Gildner et al., 2014), among others, vary in different countries and cultures.

As Baglioni, Spiegelhalder, Lombardo and Riemann (2010) stated in their review it is common to associate a good-night of sleep with positive emotions and well-being during the day, the same way a poor night of sleep is related to higher irritability and negative emotions. Depression, anxiety and stress are mental health indicators highly prevalent in clinical and non-clinical populations, damaging the quality of life (Rusli, Edimansyah & Naing, 2008). Some of the latest studies have supported the role for sleep in regulating affective states, as moods or emotions (Baglioni et al., 2010; Cho et al., 2013; Gallagher, Phillips, & Carrol, 2009; Okun, Tolge, & Hall, 2014). In line with this data early reviews revealed that sleep quality relates to depression and anxiety (Baglioni et al., 2010; João, Becker, & de Jesus, 2016), and stress (Becker, de Jesus, Marguilho, Viseu, João, & Buela Casal, 2015; Meerlo, Sgoifo, Suchecki, 2008).

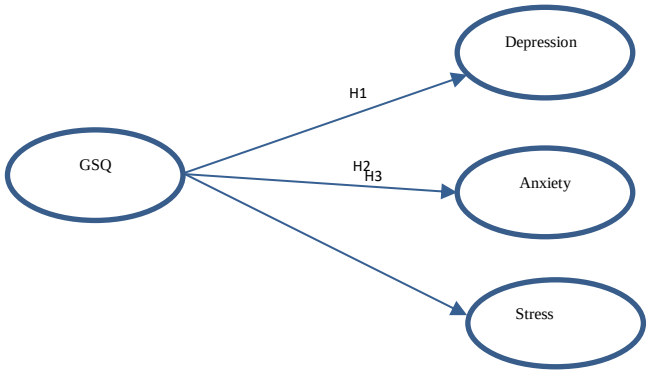
Following the tendency of other medical areas sleep researchers center their attention on the sleep quality of the general population seeking for more "normal" values and focusing on prevention (Buysse, 2014). Thus, the importance of investigating sleep quality and its outcomes in non-clinical populations. Previous studies have addressed the association in non-clinical populations of sleep quality, depression and anxiety (Anders, Breckenkamp, Blettner, Schlehofer, & Berg-Beckhoff, 2013; Castro et al., 2013; Kalmbach, Pillai, Roth, & Drake, 2014) and, sleep quality and stress (Costa, Zummer, & Fitzcharles, 2009; Gamaldo et al., 2014).

In a prior review João and coworkers (João et al., 2016) concluded that sleep quality, depression and anxiety are related. Among their 32 collected studies, eleven opted for non-clinical subjects. From those, seven concluded that mainly sociodemographic and socio-economic factors (e.g. lower social economic status, lower education, age) predicted poor sleep quality. For clinical populations, the factors influencing this association were psychosocial variables and outcomes related to the illness itself (e.g. comorbid symptoms, pain, treatment, use of medication). It seems that different factors interfere in the relationship between sleep quality, depression, anxiety and stress in clinical and non-clinical subjects.

Although there is ample evidence pointing out the relation between sleep quality, depression, anxiety and stress there is more evidence on this relationship in clinical-populations than in non-clinical populations. Similarly there are reported differences on the socio-demographic factors that influence this association on these

different populations; however the role of the variable "country" has not been yet analyzed in this context. This study aims to overcome and augment the comprehension of the relationship between sleep quality and mental health indicators in a non-clinical population and to further on the understanding of possible sociodemographic moderators in this association. Therefore, the purpose of the current study was twofold: (1) understand the relationship between sleep quality, depression, anxiety and stress in a non-clinical population, hypothesizing that sleep quality predicts depression, anxiety and stress; (2) assess which socio-demographic factors moderate this relationship, hypothesizing that (2a) gender, (2b) age and (2c) country have a moderator effect on the relationship between sleep quality and the mental health indicators. To accomplish these objectives we estimated one multivariate regression model with the PSQI global score (GSQ) as independent variable and the mental health indicators as dependent variables, from which resulted three hypotheses (Figure 1). Moreover, we intend to test the moderate role of gender, age and country in the hypothesized relationships.

Figure 1. Presentation of the conceptual model with the defined research hypotheses.



Sample and Methods

Sample

A total of 1576 participants responded to a questionnaire consisting of established instruments that assessed subjective sleep quality and symptoms of psychological distress (Pittsburgh Sleep Quality Index (PSQI); Depression Anxiety Stress Scale (DASS-21)). From those, only questionnaires from participants over 18 years old and native speakers of Portuguese (from Portugal or Brazil) or Spanish (from Spain) were considered. The final sample comprises 1552 adult participants (931 Spanish, 347 Portuguese and 274 Brazilian). A total of 929 men (59.9%) and 622

(40.1%) women, with a mean age of 31,81 (SD = 10,495) years old. The Spanish sample has a mean age of 29,69 years old, the Portuguese sample of 35,93 years old and the Brazilian sample of 33,79 years old. The majority of the respondents were separated, divorced, single or widowed (n = 844; 54.4%), followed by married or in common law (*n* = 707; 45.6%). The application process occurred online, via email, where the participants were informed about the research objectives and the link to the questionnaires was provided. The collected sample was part of a contact database designed through previous research projects of a Portuguese Research Center. The questionnaire was administered between May of 2013 and October of 2014. In order to reach the highest number of participants as possible, the contacted respondents were asked to forward the received email to their contacts. All people who participated in this research accepted by free consensus to answer the questionnaire. Depending on the country the email was sent in accordance to the language of the participants, thus, it was used three different versions of the document.

Research tools

Pittsburgh Sleep Quality Index

The sleep quality was assessed through the Pittsburgh Sleep Quality Index. The PSQI assesses sleep quality over a one-month period. The questionnaire consists of 19 self-related questions and five (5) questions that should 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 as well as reported in this article. The 19 self-related questions are categorized into seven (7) components, graded on a score that ranges from 0 to 3. 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. These components are the sum of scores which yields one global score, ranging from 0 to 21, where the highest score indicates 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, Reynolds, Monk, Berman, & Kupfer, 1989).

The validated version of the PSQI-PT (João, Becker, de Jesus, & Martins, 2017) was applied to the Portuguese sample, similarly a validated version of the PSQI-BR was administered to the Brazilian sample (Bertolazi et al., 2011) and the Spanish

participants answered to the validated version of the PSQI-ES (Hita-Contreras, Martínez-López, Latorre-Román, Garrido, Santos, & Martínez-Amat, 2014).

Depression Anxiety Stress Scale

Depression, anxiety and stress were evaluated by the Depression Anxiety Stress Scale (DASS-21) (Lovibond & Lovibond, 1995). This scale consisted of 21 self-related questions that measure depression, anxiety and stress (3-dimensions), seven items for each construct, and possessed a four-point answer scale (0 - Did not apply to me at all - Never; 3 - Applied to me very much, or most of the time - Almost Always). The Cronbach's Alpha of this scale for the constructs stress, anxiety, and depression was, respectively: (a) 0.92 (*M* = 717; *SD* = 5.39); (b) 0.90 (*M* = 4.06; *SD* = 4.51); and (c) 0.86 (*M* = 4.85; *SD* = 4.84) (Lovibond & Lovibond, 1995). In this scale it is understood that: Depression is related to loss of self-esteem and motivation, and is associated with the perception of low probability of achieving life goals that are meaningful to the individual as a person; Anxiety highlights the links between persistent state of anxiety and intense fear responses; Stress suggests states of excitement and persistent tension, with low level of frustration and disappointment resistance (Antony, Bieling, Cox, Enns, & Swinson, 1998; Lovibond & Lovibond, 1995).

To the Portuguese sample it was applied the Portuguese validated version of the DASS-21 (Ribeiro, Honrado, & Leal, 2004), likewise, to the Spanish sample the Spanish validated version (Bados, Solanas, & Andrés, 2005) and to the Brazilian sample the Brazilian validated version (do Nascimento Mascarenhas, Silva, & Ribeiro, 2011).

Data analysis methods

Multivariate linear regressions were used to test the research hypotheses H1 to H3. This method can be seen as an extension of linear regression for two or more dependent variables. It is particularly useful when the dependent variables are correlated, which happens in our study since we are intending to explain three inter-correlated dimensions of psychological distress: depression (d), anxiety (a) and stress (s) ($R_{d\text{-}a}$ =.641; $R_{d\text{-}s}$ =.722; $R_{a\text{-}s}$ =.731). In this circumstance, previous studies show that this method produces more efficient estimates than isolated regression models for each dependent variable (Marôco, 2014). So, using AMOS Graphic 21.0, the multivariate regression model was estimated. In this model the dependent variables are the final

scores in the three dimensions of the DASS-21 questionnaire: depression, anxiety and stress. These scores were obtained by summing the participants' punctuation in the seven items of each scale. Some descriptive statistics for these variables can be found in Table 1. The regression uses the global score of the PSQI, Global Sleep Quality (GSQ), as the independent variable.

Then, multiple-group analyses were performed in order to test the moderating effect of gender, age category and country (Spain, Portugal and Brazil). Since our sample is relatively young, it would be difficult to distinguish characteristics from different phases of adulthood. Therefore, to test the moderate effect of age, we decided to follow Levinson´s (Levinson, 1986) conception of adult development to differentiate age groups. In accordance to this author, we defined two age groups: until 29 years old (group 1); older than 29 years old (group 2).

Under the multiple-group analysis procedure the unrestricted model - i.e., the model where all parameters can be different across groups - is compared with a model where the path coefficients are constrained to be equal across groups. In this analysis, AMOS gives results for a first test that compares the models using the $\Delta\chi^2$ statistics. Under this test, the moderation is not significant when $\Delta\chi^2$ reports $p > .05$, meaning that the path estimates in the two groups are not statistically different (Marôco, 2014). When the moderation is significant, AMOS allow us to identify the parameters that are different between groups since it provides the critical *t* ratios for differences between parameters.

Results

Preliminary analyses

The multivariate linear regression model uses the GSQ score as a predictor of Depression, Anxiety and Stress. The sign and significance of the path coefficients in this model allow us to test H1 to H3 (Table 2). This model was estimated using the maximum likelihood estimation method. The use of this method is problematic when data depart significantly from normality, which happens when skewness and kurtosis values exceed 3 and 10, respectively (Curran, West, & Finch, 1996; Finney & DiStefano, 2006). In our study, the independent variables present absolute values for skewness and kurtosis that do not exceed 2.13 and 3.8, respectively.

Table 1. Means, standard deviations and Spearman correlation matrix for the dependent and independent variables (N = 1552)

	M^1	SD^2	Min	Max	VIF [3]
Depression	4.88	4.83	0	21	---
Anxiety	3.80	3.90	0	20	---
Stress	7.02	4.86	0	21	---
GSQ	6.42	2.92	0	17	---

Note. [1] Mean value; [2] Standard deviation

The effect of sleep quality on depression, anxiety and stress

Hypotheses H1 to H3 would be validated if the estimated coefficients in the multivariate regression model are positive and statistically significant. This means that high levels of GSQ (which means severe sleep problem) significantly increase Depression, Anxiety and Stress. Our results show that these hypotheses are validated since the correspondent path estimates are positive and significant (β_1 = .317; β_2 = .351; β_3 = .362; all p = .00). The adjusted model explains 10.1%, 12.3% and 13.1% of the variability of Depression, Anxiety and Stress, respectively. These results are not surprising meaning that although the sleeping problems have a share of responsibility in these psychological disturbances, they have other important causes besides sleep problems.

Table 2. Regression weights and hypotheses testing

Causal Relationships	**Standardized path coefficient estimate**	**Z**	**One sided-p**	**Decision about the hypothesis**
H1: QSG → Depression	0.317	13.168	0.000	Validated
H2: QSG → Anxiety	0.351	14.762	0.000	Validated
H3: QSG → Stress	0.362	15.314	0.000	Validated

Testing the moderation effects

The analysis of the moderation effect of gender on the relationship between sleeping disturbances and depression, anxiety and stress was first analyzed using the multiple-group procedure available at AMOS. This method compares the unrestricted model, i.e., the model without considering the moderation between the variables, against a model where the path coefficients are restricted to be equal across the groups (table 3). Gender will be a significant moderator in the model if the equality (i.e., invariance) in the path coefficients is rejected, meaning that the path coefficients linking the variables are statistically different between the two groups. In our multivariate regression model, which uses the GSQ score as unique independent variable, the null hypothesis that the path coefficients are equal across genders was not rejected (invariance tests to path coefficients: $\Delta\chi^2 = 1.464$; df = 3; $p = .691$). This means that the relationship between the variables measuring the sleep quality and the psychological distress variables it is not statistically different between men and women.

Then, the potential effect of age category as a moderator on the relationship between sleep quality, depression, anxiety and stress, was assessed. As with regards to gender, the same type of results were found. In the multivariate regression model the null hypothesis indicating that the path coefficients are equal between the age groups was not rejected. The invariance tests to path coefficients produce the following results: $\Delta\chi^2 = 1.218$; df = 3; $p = .749$. So, the conclusion is that age category is not a significant moderator in the relationship between the variables measuring the sleep quality and the mental health indicators.

Finally, the moderator role of country was assessed. In this situation, the variable country appears as a significant moderator in the model ($\Delta\chi^2 = 11.562$; df = 6; $p = .072$). In this model the moderation is significant for a significance level higher than 7.2%, for example, 10%.

Table 3 provides a deeper analysis of the moderation effects of the country. It shows the path estimates involved in the 3 hypotheses in the three countries, Spain, Portugal and Brazil, and their pairwise differences. Based on the results for the critical t ratios for provided by AMOS, the significant differences are signed with the symbol "*". As can be observed, there are significant differences among nationalities concerning the relationship between the sleep quality and depression (Spanish *vs* Brazilians and Portuguese *vs* Brazilians) and also in the relationship between the sleep quality and stress (Spanish *vs* Brazilians).

Table 3. Regression weights and the moderate effect of "country"

Causal Relationships	Total sample	Spain (S)	Portugal (P)	Brazil (B)	Dif. (S-P)	Dif. (S-B)	Dif. (P-B)
H1: GSQ → Depression	0.317	0.283**	0.311**	0.339**	-0.028	-0.056**	-0.028*
H2: GSQ → Anxiety	0.351	0.310**	0.362**	0.406**	-0.052	-0.096	-0.044
H3: GSQ → Stress	0.362	0.342**	0.315**	0.418**	0.027	-0.076*	-0.103

**: $p < .01$; * $p < .05$

Discussion

Our study followed the current tendency of other mental and physical health areas by focusing on the general population, expecting to define a new path for a good quality of life by centering on prevention. The impact that sleep quality has in mental health on a non-clinical population was analyzed through three different hypotheses (H1 to H3) which were all validated. Consequently, our results demonstrated that sleep quality predicts mental health in these samples. These findings are consistent with several researches that confirmed how sleep quality relates to psychological distress in these populations (Benitez & Gustand, 2012; Fernandez-Mendoza, Shea, Vgontzas, Calhoun, Liao, & Bixler, 2015). Nonetheless, our predictions were only partially confirmed since the analysis of the moderator effect of the variables "gender", "age" and "country" revealed that only "country" moderated the relationship between sleep quality and mental health.

Although researches have pointed to the importance of socio-demographic variables as age and gender (Arber, Bote, & Meadows, 2009; Chen, Kawachi, Subramanian, Acevedo-Garcia, & Lee, 2005; Grandner et al., 2012; Kaplan, Hardas, Redline, Zeitzer, & Sleep Heart Health Study Research Group, 2017; Mellor, Waters, Olaithe, McGowan, & Bucks, 2014; Zeitlhofer et al., 2000) no evidence has been stated before on the importance of country in the relationship between sleep quality and

mental health. In this study we analyzed the possible moderator effect of gender, age and country on this relationship.

Gender has been described throughout several researches as a sociodemographic factor associated to sleep quality, usually women reporting severer sleep difficulties than men (Arber et al., 2009; Chen et al., 2005; Mellor et al., 2014). In our sample gender did not moderate the association between sleep quality and mental health indicators. Nevertheless, previous literature concluded that gender differences on self-reported sleep quality are due to socioeconomic status variables (Arber et al., 2009), social roles (Chen et al., 2005) and age (Mellor et al., 2014). Although women in some societies may have less opportunities then men for education and subsequently, adequate employment, there is a current tendency in other societies to normalize opportunities between women and men which it could explain why our sample did not present gender differences across countries.

Concerning the influence of age in sleep quality, the state of art has been contradictory. Some authors confirm that the increasing of age results in more subjective sleep complaints (Zeitlhofer et al., 2000), others report that older adults are less likely to report sleep problems than younger adults (Grandner et al., 2012) and middle aged adults (Kaplan et al., 2017). One possible explanation for age having no moderation effect on our sample could reside on the fact that ours was a relatively young sample and literature has stated that age sleep quality differences are more evident when comparing young adults or middle aged with older adults.

Previous studies confirm the cultural differences in sleep behavior among different countries (Hollan, 2013; Ohayon, 2004; Worthman & Brown, 2013), demonstrating that normative sleep behavior characterization it is not universal. Hense et al. (2011) analyzed children night sleep in eight different European countries and suggested that region, culture and environmental characteristics interfered more with sleep duration than individual factors. On a different age strata and using data from the first wave of the World Health Organization's study on global ageing and adult health (SAGE), on six middle income countries (China, Ghana, India, Mexico, the Russian Federation, and South Africa), Gildner et al. (2014) concluded that sleep duration and sleep quality differed among countries. Thus, we expected “country” to moderate the relationship between sleep quality and mental health when comparing data from Portuguese, Spanish and Brazilian samples. In our study there is evidence on the differences on how the sleep quality relates to, depression and stress when comparing

Spanish and Brazilians, and only to depression when comparing Portuguese and Brazilians. Still, there is no corroboration of "country" moderating the relationship between sleep quality and anxiety. As well, there is no confirmation of the differences on the relationship between sleep quality and either of the mental health indicators when comparing Portuguese and Spanish. Indeed, there are more geographic and cultural similarities between Portugal and Spain, as neighboring European countries in the Iberian Peninsula, which possibly explain these results. Similarly, a large-scale global cross-sectional survey conducted on subjects from ten different countries (including Portugal, Spain and Brazil) suggested important global variations in sleep quality and sleep aspects (Soldatos, Allaert, Ohta, & Dikeos, 2005). Moreover, differences were highlighted between Portugal and Brazil, with Brazil presenting the highest rate of napping and Portugal the lowest, and similarities, encountered between Spain and Portugal, since both countries presented the later bedtimes (Soladatos et al., 2005).

Conclusions

Thus, our data confirms that the sleep quality influences the mental health indicators in non-clinical populations, contributing to the current state of the art. Additionally, we have heightened the current investigation since our results confirmed that country relates to the way sleep quality influences mental health. These promote further investigating in order to assist future public, mental and sleep health campaigns and policies.

This cross-sectional study does not infer chronological assumptions concerning conclusions of causality, thus it would be of value for future research to analyze the hypothesized models using longitudinal studies. As well, the recruiting strategy used may create a selection bias, still, the final sample had to comply with the defined inclusion criteria. Furthermore, other moderator variables (e.g., socioeconomic status and social roles) can be used, in an attempt to understand their effect on the relationships between sleep quality and mental health indicators. Lastly, it would be useful to conclude similar studies in other developed and developing countries to address the interference of "culture" and "socioeconomic status" in these relationships with the objective of comparing the obtained results.

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Conflict of interest

There have been no financial and/or personal conflicts in the realization of this study.

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6. Estudo 5: "Sleep quality components and mental health: Study with a non-clinical population"

João, K. A. D. R., Saul, de Jesus., Carmo, C., & Pinto, P. (2018). Sleep quality components and mental health: Study with a non-clinical population. *Psychiatry Research* (submitted).

Abstract

The deconstructing of sleep quality into its particular components may help to specify how each one of them influences mental health. Thus, to specify the understanding of the relationship between sleep quality and mental health our study aimed to assess the relationship between each component of the Pittsburgh Sleep Quality Index (PSQI) and depression, anxiety and stress. Also, we intended to analyze the moderator effect of gender, age and country on these relationships. The instruments PSQI and Depression Anxiety Stress Scale (DASS-21) were applied to a non-clinical population of 1552 participants from tree different countries (Portugal, Spain and Brazil), aged over 18 years old. We estimated a multivariate regression model with AMOS Graphic 21.0 to test the seven proposed research hypotheses. The adjusted model explains 14.0%, 21.0% and 19.3% of the variance of depression, anxiety and stress, respectively. In conclusion this study demonstrated that, with the exception of subjective sleep quality, all the other six components of the PSQI individually relate to mental health in non-clinical populations, and that country is a significant moderator of these relationships.

Keywords: Sleep quality components, Pittsburgh Sleep Quality Index, Non-clinical population, Mental health

Introduction

The relationship between sleep quality and mental health has been previously addressed and resulting data has attested it (Kilicaslan, Esen, Kasal, Ozelci, Boysan, & Gulec, 2017; João, Becker, & Neves de Jesus, 2016; João, Neves de Jesus, Carmo, & Pinto, 2018; Reddy, Palmer, Jackson, Farris, & Alfano, 2017). Studies have established a strong relationship between sleep disturbances, depression (Kalmbach, Pillai, Roth, & Drake, 2014; Plumb, Peachey, & Zelman, 2014; Riemann, 2014), anxiety (Kalmbach et al., 2014; Mellman, 2006; Plumb et al., 2014; Roth, Jaeger, Jin, Kalsekar, Stang, & Kessler, 2006) and stress (Almojali, Almalki, Alothman, Masuadi, & Alaqeel, 2017; Meerlo, Sgoifo, & Suchecki, 2008). Still, this evidence is more abundant in clinical populations when compared to populations with no specific clinical complaints. Since different areas of medicine have shown an increased interest in prevention and in a more positive attitude towards physical and mental health (Mollayeva, Thurairajah, Burton, Mollayeva, Shapiro, & Colantonio, 2016) it is crucial to assess the impact of sleep quality on the mental health of these populations.

However, understanding how sleep quality relates to different aspects of mental health presents some difficulties, as, how to measure sleep quality. Several studies have compared data from sleep quality measured subjectively through self-reported questionnaires, to data assembled with objective techniques, and they have concluded that correlations between data are poor (Backhaus, Junghanns, Broocks, Riemann, & Hohagen, 2002, Buysse, Reynolds, Monk, Berman, & Kupfer, 1989; Edinger et al, 2000; Grandner et al., 2006). Thus, considering the objective and subjective evaluation of sleep quality is important because they allow measuring different aspects of sleep.

To overcome some of the limitations of the objective evaluation of sleep, i.e. high economical cost, time burden for researchers and patients (Bertolazi, Fagondes, Hoff, Dartora, da Silva Miozzo, de Barba, & Barreto, 2011) researchers have developed questionnaires easier and faster to administrate. The application of self-report questionnaires for the analysis of sleep quality in research and at clinical settings facilitates de assessment of sleep as a complex and individual behavior (Buysse, Germain, & Moul, 2005). Previous research has identified which aspects of sleep behavior are recognized by individuals as referring to sleep quality, some of these are; decreased sleep latency, less nighttime awakenings, fewer awakenings after sleep onset and sleep efficiency (Ohayon et al., 2017), total sleep time (Bastien, Fortier-Brochu,

Rioux, LeBlanc, Daley, & Morin, 2003), feeling rested, restored and refreshed (Hayley, Williams, Berk, Kennedy, Jacka, & Pasco, 2013), and mood and physical feelings on waking (Webb, Bonnet, & White, 1976).

The Pittsburg Sleep Quality Index (PSQI) is a multi-item questionnaire that assesses subjective sleep quality over a one-month period through 19 self-related questions categorized into 7 components, which measure different aspects of sleep (i.e., subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction). Its psychometric properties have been examined in multiple studies (Hinz et al., 2017) and it has been used in different cultures, in clinical and non-clinical populations (João et al., 2016). For this study we have defined sleep quality through the seven aspects of sleep contained within the PSQI.

João et al. (2018) in a previous study aiming the analysis of the relationship between the Global Sleep Quality Index (GSQ) and the mental health indicators (i.e. depression, anxiety and stress) in a non-clinical population concluded that the PSQI´s GSQ Index explained 10.1%, 12.3% and 13.1% of the depression, anxiety and stress variance. Other studies using the PSQI with non-clinical populations determined that the GSQ Index is related to depression, anxiety (Hsieh, Li, Chang, Lai, Wang, & Wang, 2011; Kalmback, Pillai, Roth, & Drake, 2014; Plumb, Peachey, & Zelman, 2014) and stress (Mellor, Waters, Olaithe, McGowan, & Bucks, 2014).

As well, João et al. (2018) reported that from the sociodemographic factors analyzed (i.e. age, gender and country), only "country" had a moderator effect on this relationship. Several sociodemographic variables have been associated to sleep quality, such as; age and gender (Kaplan, Hardas, Redline, Zeitzer, & Sleep Heart Health Study Research Group, 2017; Mellor, Waters, Olaithe, McGowan, & Bucks 2014), social roles (Chen, Kawachi, Subramanian, Acevedo-Garcia, & Lee, 2005), economic status (Arber, Bote, & Meadows, 2009), among others. Nevertheless there is some controversy with some of them age, for example age has been stated to only differ on levels of sleep problems when comparing older adults to younger adults (Grandner et al., 2012) and middle aged adults (Kaplan et al., 2017). Similarly the differences encountered on sleep quality based on gender could be based on socioeconomic factors as social roles (Chen et al., 2005) and economic status (Arber et al., 2009), age (Mellor et al., 2014). Lately, the social, cultural and anthropological aspects of sleep have been considered as playing an important role on sleep routines and quality (Hollan, 2014). Nevertheless there is

lack of data considering these aspects, for example, how does country and/or culture relate to different aspects of sleep quality?

Nonetheless, to our knowledge no article has analyzed the specificity of the relationship between each PSQI component (i.e. subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication and daytime dysfunction) and the levels of depression, anxiety and stress in a non-clinical population, and, as well, the possible moderator effect of gender, age and country on these relationships. The deconstructing of sleep quality into its particular objective components may help to specify till which extent each one of them influences mental health. This can facilitate the implementation of sleep health programs targeted to individuals with different sleep quality specifications, as well as identify different approaches in clinical interventions. Thus, to further on the results of João et al. (2018) and in order to specify the understanding of the relationship between sleep quality and mental health our study intends to: (1) test that each component of the PSQI has a significant positive effect on depression, anxiety and stress, and (2) analyze the possible moderator effect of gender, age and country on the hypothesized relationships. Accordingly, seven hypotheses are proposed:

H1: Higher scores of *Subjective sleep quality* (meaning worse subjective sleep quality) are related with higher levels of depression, anxiety and stress.

H2: Higher scores of *Sleep latency* (meaning more time taken in minutes to fall at sleep) are related with higher levels of depression, anxiety and stress.

H3: Higher scores of *Sleep duration* (meaning less hours of sleep) are related with higher levels of depression, anxiety and stress.

H4: Higher scores of *Sleep efficiency* (meaning worse sleep efficiency) are related with higher levels of depression, anxiety and stress.

H5: Higher scores of *Sleep disturbances (*meaning more symptoms of sleep disturbances*)* are related with higher levels of depression, anxiety and stress.

H6: Higher scores of *Sleeping medication* (meaning taking medication more frequently) are related with higher levels of depression, anxiety and stress.

H7: Higher scores of *Daytime dysfunctions* (meaning more daytime dysfunctions) are related with higher levels of depression, anxiety and stress.

Methods

Sample

A total of 1576 participants responded to a questionnaire consisting of established instruments that assessed subjective sleep quality and symptoms of psychological distress (PSQI; DASS-21). From those, only questionnaires from participants over 18 years old and native speakers of Portuguese (from Portugal or Brazil) or Spanish (from Spain) were considered. The final sample comprised 1552 adult participants over 18 years old (931 Spanish, 347 Portuguese and 274 Brazilian). The procedures and methodology used in this research follow the ethical rules for data collection and their usage of the Research Center for Spatial and Organizational Dynamics (CIEO), which follow the APA (American Psychology Association) Ethics Code (APA, 2010). The application process occurred online, via email, where the participants were informed about the research objectives and the link to the questionnaires was provided. The collected sample was part of a contact database designed through previous research projects of a Portuguese Research Center. The questionnaire was administered between May of 2013 and October of 2014. In order to reach the highest number of participants as possible, the contacted respondents were asked to forward the received email to their contacts. All people who participated in this research accepted by free consensus to answer the questionnaire.

Research tools

Pittsburgh Sleep Quality Index

The sleep quality was measured through the PSQI. This questionnaire assesses sleep quality over a one-month period and consists of 19 self-related questions and 5 questions that should 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 as well as reported in this article. The 19 self-related questions are categorized into seven components, graded on a score that ranges from 0 to 3, with a higher score representing poorer sleep quality. 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. These components are the sum of scores which yields one global score, ranging from 0 to 21, where the highest score indicates worse sleep quality. A global PSQI score greater than five indicates major difficulties in, at least, two (2) components

or moderate difficulties in more than three (3) components. The Cronbach's Alpha for the PSQI components was 0.83 (Buysse et al., 1989). To each country´s sample it was applied a validated version of the PSQI (i.e. Portugal (João, Becker, de Jesus Neves & Martins, 2017); Brazil (Bertolazi et al., 2011), and Spain (Hita-Contreras, Martínez-López, Latorre-Román, Garrido, Santos, & Martínez-Amat, 2014).

Depression Anxiety Stress Scale

Depression, anxiety and stress were evaluated by the DASS-21. This scale consists of 21 self-related questions that measure depression, anxiety and stress, seven items for each construct, and possessed a four-point answer scale (0 - *Did not apply to me at all* - Never; 3 - *Applied to me very much, or most of the time* - Almost Always). The Cronbach's Alpha of this scale for the constructs stress, anxiety, and depression was, respectively: 0.92 (*M* = 7.17; *SD* = 5.39); 0.90 (*M* = 4.06; *SD* = 4.51); and 0.86 (*M* = 4.85; *SD* = 4.84) (Loviboond & Lovibond, 1995). In this scale it is understood that: Depression is related to loss of self-esteem and motivation, and is associated with the perception of low probability of achieving life goals that are meaningful to the individual as a person; Anxiety highlights the links between persistent state of anxiety and intense fear responses; Stress suggests states of excitement and persistent tension, with low level of frustration and disappointment resistance (Antony, Bieling, Cox, Enns, & Swinson, 1998; Lovibond & Lovibond, 1995). To each country´s sample it was applied a validated version of the DASS-21 (i.e. Portugal (Ribeiro, Honrado, & Leal, 2004); Brazil (do Nascimento Macarenhas, da Silva, & Ribeiro, 2011), and Spain (Bados, Solanas, & Andrés, 2005).

Data analysis methods

Using AMOS Graphic 21.0 a multivariate regression model was estimated with the aim of testing the proposed research hypotheses. The difference between this model and the classic linear regression model is that the former allows two or more dependent variables. In our study, the model considers the final scores in the three dimensions of the DASS-21 questionnaire - depression, anxiety and stress – as dependent variables. To calculate these scores, the participants' punctuation in the seven items of each scale was computed. Table 1 shows descriptive statistics for these new variables. The interest of multivariate regression increases when the dependent variables are strongly correlated which happens in our study ($R_{depression\text{-}anxiety}$ =.641; $R_{depression\text{-}stress}$ =.722; $R_{anxiety\text{-}stress}$

=.731). The regression uses the seven components of the PSQI as independent variables: subjective sleep quality (C1), sleep latency (C2), sleep duration (C3), habitual sleep efficiency (C4), sleep disturbances (C5), use of sleeping medication (C6) and (C7) daytime dysfunction.

Subsequently, in order to test the moderating effect of gender, age category and country (Spain, Portugal and Brazil), multiple-group analyses were performed. To test the moderate effect of age, and since our sample is relatively young, we followed Levinson´s (1986) conception of adult development to differentiate age groups. Thus, we defined two age groups: until 29 years old (group 1); older than 29 years old (group 2).

Throughout the multiple-group analysis procedure the unrestricted model - i.e., the model where all parameters can be different across groups - is compared with a model where the path coefficients are constrained to be equal across groups. In this analysis, AMOS gives results for a first test that compares the models using the $\Delta\chi^2$ statistics. With this test, the moderation is not significant when $\Delta\chi^2$ reports $p > .05$, meaning that the path estimates in the two groups are not statistically different (Marôco, 2014). Thus, AMOS allows the identification of the parameters that are different between groups, when the moderation is significant, as it provides the critical *t* ratios for differences between parameters.

Results

Preliminary analyses

The final sample consisted of 1552 adult participants over 18 years old. Overall, 929 men (59.9%) and 622 (40.1%) women, with a mean age of 31,81 (SD = 10,495) years old and median age of 29 years old. The majority of the respondents were separated, divorced, single or widowed (n = 844; 54.4%), followed by married or in common law (n = 707; 45.6%).

In our study the model was estimated using the maximum likelihood (ML) estimation method and the seven components of the PSQI as the independent variables. These variables present absolute values for skewness and kurtosis that do not exceed 3.8, respectively. This is an important finding since the ML estimation method would produce biased results when skewness and kurtosis values exceed 2 and 7, respectively (West, Finch, & Curran 1995). The level of collinearity among the independent

variables was also tested. As reported in table 1, the Spearman correlations between the seven components are all very low, with the exception of the correlation between C3 and C4 that equals 0.41. Moreover, no variable reports a Variance Inflation Factor (VIF) higher than the critical value of 5 (all VIFs < 1.3), meaning that data do not present collinearity problems. Table 1 and Table 2 show more descriptive statistics for the variables under analysis.

Table 1. Means, standard deviations, VIFs for the independent variables (*N* = 1552)

	M[1]	***SD***[2]	**Min**	**Max**	**VIF**[3]
Depression	4.88	4.83	0	21	---
Anxiety	3.80	3.90	0	20	---
Stress	7.02	4.86	0	21	---
C1	1.04	0.89	0	3	1.09
C2	1.34	0.97	0	3	1.17
C3	0.61	0.84	0	3	1.25
C4	0.37	0.74	0	3	1.28
C5	1.26	0.49	0	3	1.16
C6	0.47	0.88	0	3	1.06
C7	1.33	0.90	0	3	1.10

Note. *M* = Mean; *SD* = Standard deviation; *VIF* = Variance inflation factor

Table 2. Spearman correlation matrix for the independent variables (N = 1552)

	C1	**C2**	**C3**	**C4**	**C5**	**C6**	**C7**
C1	1						
C2	0.09**	1					
C3	0.08**	0.22**	1				
C4	0.09**	0.28**	0.41**	1			
C5	0.21**	0.27**	0.19**	0.19**	1		
C6	-0.04	0.04	0.09**	0.04	0.09**	1	
C7	0.19**	0.09**	0.07**	-0.01	0.13**	0.19**	1

The effect of sleep quality components on depression, anxiety and stress

The research hypotheses were tested in the multivariate regression model. The adjusted model explains 14.0%, 21.0% and 19.3% of the variability of depression, anxiety and stress, respectively. In H1 it is hypothesized that a high level of subjective sleep quality (C1), which means that the participant classifies badly his/her sleep in the last month, implies high levels of depression, anxiety and stress. As Table 3 shows, this hypothesis is not validated since the correspondent path estimates are negative (β_{1a} = -0.04; β_{1b} = -0.03; β_{1c} = -0.01), and, with the exception of β_{1c}, are not significant (p > 0.05).

The effect of sleep latency (C2) on depression, anxiety and stress is captured by β_{2a}, β_{2b} and β_{2c} in the proposed hypothesis H2. This hypothesis establishes that high levels of sleep latency conduct to high levels of psychological distress. Results reported in Table 2 regarding this hypothesis allow us to validate it since all involved estimates are positive and statistically significant (β2a = 0.17; β2b = 0.13; β2c = 0.20; all p = 0.00).

H3 focuses on the effect of sleep duration (C3) on depression, anxiety and stress. This hypothesis implies that to a higher score in C3, that is, less hours of sleep, corresponds a higher level of psychological distress. Our results validate H3 since the involved path estimates are statistically significant. Moreover, a positive relationship was found (β3a = 0.09; β3b = 0.13; β3c = 0.14; all p = 0.00).

The effect of sleep efficiency (C4) on depression, anxiety and stress is established in the proposed hypothesis H4. This hypothesis states that bad sleep efficiency, which implies a high score in C4, conducts to high levels of psychological distress. In empirical terms, it will be validated if the respective path estimates are positive and statistically significant. As Table 3 shows, the involved estimates are positive, although close to zero (β4a = 0.05; β4b = 0.00; β4c = 0.03), and only the first estimate is significant for a 5% significance level (p = 0.043). Accordingly, H4 is only partially supported.

As stated in H5, it is expected that higher levels of sleep disturbances (C5) are associated to higher levels of depression, anxiety and stress, i.e., a positive relationship between the variables. This hypothesis is validated since all the involved path estimates are positive and statistically significant (*(β5a = 0.21; β5b = 0.34; β5c = 0.24; all p = 0.00).*

H6 proposes that higher levels of sleep medication (C6), meaning serious sleeping problems, are associated to higher levels of depression, anxiety and stress, i.e.,

a positive connection between the variables. This hypothesis is validated since the involved path estimates are positive and statistically significant (β6a = 0.06; β6b = 0.04; β6c = 0.06; all $p < 0.05$).

Finally, H7 focuses on the effect of daytime dysfunctions (C7) on depression, anxiety and stress. Daytime dysfunctions are a symptom of sleeping problems so they are potentially associated to higher levels of depression, anxiety and stress, i.e., a positive connection between the variables is expected. The hypothesis is partially validated since two path estimates are positive and statistically significant (β7a = 0.08; β7c = 0.09; all $p < 0.01$) but the other, although positive, was not statistically significant (β7b = 0.03, $p = 0.13$).

Table 3. Regression weights and hypotheses testing

Causal Relationships	Standardized path estimate	*Z*	One sided-*p*	Decision about the hypothesis
C1 → Depression	-0.04	-1.05	0.15	HI
C1 → Anxiety	-0.03	-2.52	0.01	Not
C1 → Stress	-0.06	6.59	0.00	Supported
C2 → Depression	0.17	5.33	0.00	H2
C2 → Anxiety	0.13	8.20	0.00	Supported
C2 → Stress	0.20	3.23	0.00	
C3 → Depression	0.09	5.24	0.00	
C3 → Anxiety	0.13	5.83	0.00	H3 - Supported
C3 → Stress	0.15	1.72	0.04	
C4 → Depression	0.05	1.06	0.15	H4 – Partially supported
C4 → Anxiety	0.00	0.14	0.45	
C4 → Stress	0.03	8.12	0.00	
C5 → Depression	0.21	13.85	0.00	H5 – Supported
C5 → Anxiety	0.34	9.57	0.00	
C5 → Stress	0.24	2.32	0.01	
C6 → Depression	0.06	1.87	0.03	H6 – Supported
C6 → Anxiety	0.04	2.54	0.01	
C6 → Stress	0.06	3.05	0.00	
C7 → Depression	0.08	1.15	0.13	H7 – Partially supported
C7 → Anxiety	0.03	3.78	0.00	
C7 → Stress	0.09	-1.05	0.15	

Testing the moderation effects

The analysis of the moderation effect of gender on the relationship between sleeping disturbances and depression, anxiety and stress was first analyzed using the multiple-group procedure available at AMOS. This method compares the unrestricted model, i.e., the model without considering the moderation between the variables,

against a model where the path coefficients are restricted to be equal across the groups (Table 4). Gender will be a significant moderator in the model if the equality (i.e., invariance) in the path coefficients is rejected, meaning that the path coefficients linking the variables are statistically different between the two groups. In our multivariate regression model, which uses the seven components of the PSQI as independent variables, the null hypothesis that the path coefficients are equal across genders was not rejected (invariance tests to path coefficients: $\Delta\chi2 = 26.66$; df = 21; p = 0.18). This means that the relationship between the variables measuring the sleeping problems and the mental health indicators variables is not statistically different between men and women.

Then, the potential effect of age category as a moderator on the relationship between sleep quality components and depression, anxiety and stress, was assessed. As with regards to gender, the same type of results was found. In our multivariate regression model, the null hypothesis that the path coefficients are equal between the age groups was not rejected. The invariance tests to path coefficients produce the following results: $\Delta\chi2 = 21.49$; df = 21; p = 0.37. So, the conclusion is that age category is not a significant moderator in the relationship between the variables measuring the sleeping problems and the psychological distress variables.

Finally, the moderator role of country of origin was assessed. In this situation, the variable country appears as a significant moderator in our model ($\Delta\chi2 = 141.78$; df = 42; p = 0.00).

Table 4 provides a deeper analysis of the moderation effects of the country of residence. It shows the path estimates involved in the 7 hypotheses in the three countries, Spain, Portugal and Brazil, and their pairwise differences. Based on the results for the critical t ratios for differences between parameters provided by AMOS, the significant differences are signed with the symbol "*". Only in the relationship involving the sleeping variable "sleep efficiency" (C4) the moderation was not significant in any case.

Table 4 .Regression weights and the moderate effect of "country"

Causal Relationships	Total sample	Spain (S)	Portugal (P)	Brazil (B)	Dif. (S-P)	Dif. (S-B)	Dif. (P-B)
C1 → Depression	-0.035	-0.057*	-0.018	0.037	-0.039	-0.094	-0.055
C1 → Anxiety	-0.025	-0.033	-0.063	0.041	0.03	-0.074	-0.104
C1 → Stress	-0.060	-0.052	-0.131**	0.012	0.079	-0.064	-0.143*
C2 → Depression	0.167**	0.158**	0.213**	0.017	-0.055	0.141*	0.196*
C2 → Anxiety	.0.130**	0.131**	0.233**	-0.035	-0.102	0.166**	0.268**

C2 → Stress	0.202**	0.205**	0.215**	0.047	-0.01	0.158*	0.168*
C3 → Depression	0.085**	0.037	0.134**	0.063	-0.097	-0.026	0.071
C3 → Anxiety	0.132**	0.11**	0.168**	0.093	-0.058	0.017	0.075
C3 → Stress	0.148**	0.1**	0.208**	0.134	-0.108*	-0.034	0.074
C4 → Depression	0.046*	0.059	0.066	0.054	-0.007	0.005	0.012
C4 → Anxiety	0.027	-0.003	0.063	-0.008	-0.066	0.005	0.071
C4 → Stress	0.004	0.012	0.056	-0.083	-0.044	0.095	0.139
C5 → Depression	0.206**	0.23**	0.202**	0.051	0.028	0.179**	0.151
C5 → Anxiety	0.336**	0.353**	0.33**	0.274**	0.023	0.079*	0.056
C5 → Stress	0.235**	0.243**	0.248**	0.137**	-0.005	0.106	0.111
C6 → Depression	0.056*	0.031	0.037	0.055	-0.006	-0.024	-0.018
C6 → Anxiety	0.043*	0.007	-0.028	0.194**	0.035	-0.187*	-0.222**
C6 → Stress	0.059**	0.036	0.058	0.093*	-0.022	-0.057	-0.035
C7 → Depression	.0.075**	0.009	-0.071	0.518**	0.08	-0.509**	-0.589**
C7 → Anxiety	0.027	0.02	-0.055	0.244**	0.075	-0.224**	-0.299**
C7 → Stress	0.090**	0.052	-0.029	0.441**	0.081	-0.389**	-0.47**

Discussion

Aiming the comprehensive coverage of the relationship between the main domains of sleep quality within the PSQI and mental health may help the development of targeted interventions. Hence, we proposed a model with 7 hypotheses, from those only 1 was not supported, and 2 were partially supported. This model explains 14.0%, 21.0% and 19.3% of the variance of depression, anxiety and stress, respectively, in comparison to 10.1%, 12.3% and 13.1% of the previous study (João et al., 2018). These differences are understood since the model with the PSQI components isolates the effects of several dimensions thus improving the explained variability in comparison to the model with the global sleep quality.

Moreover, João et al. (2018) stated that from the 3 sociodemographic variables assessed (gender, age and country) only country had a moderator effect on the relationship between global sleep quality and mental health. Similarly, in our data only country moderated the relationship between the sleep quality components and, depression, anxiety and stress with the exception of the relationship involving *sleep efficiency*. That is, belonging to Portugal, Spain or Brazil differentiates how *subjective sleep quality*, *sleep latency*, *sleep duration*, *sleep disturbances*, *use of sleeping medication*, and *daytime dysfunction* relate to mental health. Consonantly, Soldatos, Allaert, Ohta, and Dikeos (2005) in their large-scale global cross-sectional survey conducted on subjects from ten different countries (including Portugal, Spain and Brazil) verified important global variations in sleep quality and sleep aspects between countries. Furthermore, in line with our results, they emphasized sleep aspects

differences between Brazil and Portugal and Brazil and Spain and similarities between Spain and Portugal.

Subjective sleep quality is assessed in the PSQI by questioning during the past month how would you classify your sleep quality, as “very good”, “good”, “bad” or “very bad”. From the seven domains of the PSQI, is considered the most “qualitative” subscale (Buysse et al., 1989, Buysse et al., 2008). This could help explain why in the present model with the three countries it was not associated to depression, anxiety nor stress. As well, since ours is a non-clinical population, the levels of depression, anxiety and stress are low which could underestimate the effect of this subjective aspect of sleep quality. Previous studies confirmed that different people interpret their sleep quality through different aspects of sleep, such as, sleep duration (Bastien et al., 2003), sleep latency (Kecklund et al., 2003), day sleepiness (Hayley et al., 2013), daily mood and physical feelings on waking (Webb et al., 1976), among others. Thus, how people interpret their sleep quality may relate to other aspects of people´s life besides the mental health complaints (e.g., age and gender (Kaplan et al., 2017; Mellor et al., 2014), pre-existing physical and mental health (Chen et al., 2005), economic and working status (Arber et al., 2009; Chen tel al., 2005) and country of origin (Hollan, 2013)). For instance, in our sample, when analyzing each country, subjective sleep quality relates to depression in the Spanish population, and to stress in the Portuguese population. As well, the influence of country on the relationship between subjective sleep quality and mental health was significant only when comparing Portuguese and Brazilians, and in the case of stress. That is, although subjective sleep quality was not significantly associated in the all sample to mental health, the way it related to stress it was different between Portuguese and Brazilians.

The second component of the PSQI is *sleep latency* and although commonly it refers to the amount of time necessary to initiate sleep, its score on the PSQI is measured with two different questions: during the past month how long it usually takes to fall asleep and how many times it takes more than 30 minutes. From the time to go to bed to the time to fall asleep, when surpassing 30 minutes, one’s mind and body may enter a state of restlessness responsible for physical and mental impairment. Ohayon and Roth (2001) performed a cross-sectional telephone survey with 24.600 general population-based subjects from France, the UK, Germany, Italy, Portugal, and Spain. They found that sleep latency ≥ to 30 minutes it was associated to day time consequences, and mental disorders. Likewise, our study established that *sleep latency*

had a positive effect on depression, anxiety and stress since to higher values of sleep latency corresponded higher levels of psychological distress. Furthermore, this positive effect was different when comparing Portuguese and Brazilians, and Spanish and Brazilians, still there were no significant differences between Spanish and Portuguese.

The third domain of the PSQI is *sleep duration* and responders can answer by choosing from four different options; sleeping >7h, 6 to 7h, 5 to 6h and <5h. Self-reported sleep duration influences the way people interpret their sleep and their quality of life. Prior investigation conveyed that self-reported sleep duration is related to physical and mental health impairment (Kim, Lee, Lee, Han, & Park, 2016; Tsapanou et al., 2017). Kim et al. (2016) in a survey with 17, 638 participants from the general population concluded that short, or long, sleep duration correlated to different subcategories of mental health, such as; stress, depressive symptoms, thoughts of suicide and psychiatric counselling. Similarly our study demonstrated that *sleep duration*, relates to mental health in a non-clinical population, furthermore, it identified that the lesser the amount of ours slept the higher the levels of depression, anxiety and stress. Regarding the moderator effect of country in the relationship between sleep duration and mental health we confirmed that only the Spanish and Portuguese present significant differences on how the amount of hours they sleep interferes with their stress.

Habitual sleep efficiency (total hours in bed x 100) did not predict anxiety or stress in our study but predicted depression. This component captures difficulties in falling asleep and maintaining sleep. Symptoms of depression have been associated to the fragmentation of sleep by the frequent occurrence of wake periods at night, thus reducing sleep efficiency (Borbély & Wirz-Justice, 1982). Other studies have related sleep efficiency to depression (Gillin et al., 1981; Chiang et al., 2017). Consonantly our data evinced that *habitual sleep efficiency* had a positive effect on depression which means that to better sleep efficiency corresponds better mental health. Still we could not verify that this domain is related to neither anxiety nor stress. Ramsawh, Stein, Belik, Jacobi, and Sareen, (2009) using data from the German Health Survey realized that *sleep duration* and *habitual sleep* efficiency were the PSQI components less associated to anxiety disorders. As well, *sleep efficiency* was the only sleep component that did not differentiate between countries.

The PSQI subscale *sleep disturbances* although not capable of diagnosing properly sleep disorders may point to specific areas of sleep complaints (Buysse et al.,

1989). Sleep disorders are so intimately related to mental health that they can represent a criterion to diagnose some mental health disturbances (e. g., Major Depressive Disorder) (APA, 2014). Earlier studies have suggested the association between sleep disturbances and mental health (Baldwin et al., 2010; Breslau, Roth, Rosenthal, & Andreski, 1996; Ford & Kamerow, 1989). Correspondingly in our population the component *sleep disturbances* relates to depression, anxiety and stress. Also, although ours is a population with low *use of sleeping medication,* still this component proved to be associated to depression, anxiety and stress. This is a matter of interest since further understanding on how sleep disturbances are linked to the use of sleeping medication could help comprehend how these domains of sleep quality relate to mental health in non-clinical populations from different countries. Since, when comparing Portuguese and Brazilians, and Spanish and Brazilians, we realize that their levels of sleep disturbances and use of sleeping medication relate differently to their mental health.

Lastly, to assess *daytime dysfunction* with the PSQI it is asked to which extent, during the past month, people had difficulty on staying awake, or lack of motivation, through daily routines (e.g., meals, driving, social activities). This component usually presents lower item-total correlations than other components (Buysse et al., 1989; Buysse et al., 2008). In our population *daytime dysfunction* predicted depression and stress but not anxiety. On the same path Hayley et al. (2013) realized that daily sleepiness was associated with an increased possibility of current and lifetime history of depressive symptoms but not with anxiety symptoms. We emphasize that the effect of daytime dysfunction on mental health was different when comparing Portuguese and Brazilians, and Spanish and Brazilians. Thus most of the differences encountered on the sleep aspects of our sample were when comparing Portuguese and Brazilians, and Spanish and Brazilians, not surprising since there are more geographic and cultural similarities between Portugal and Spain, as neighboring European countries in the Iberian Peninsula, which possibly explain these results.

Thus, our data confirms that six out of seven components of the PSQI individually relate to mental health in non-clinical populations and that country has an important role in this relationship. These findings underscore the importance of understanding the specificities of sleep quality complaints when relating to the mental health of non-clinical populations providing a better focus for the prevention of sleep disorders and psychological distress as well as enhancing targeted treatment for sleep difficulties.

Forthcoming research should investigate the hypothesized model using longitudinal studies, thus inferring chronological assumptions concerning conclusions of causality. One other limitation of this study was the lack of objective laboratory measurements of sleep quality as well as deeper subjective assessment through sleep diary. As well, the study was limited to three countries, thus future investigation should integrate other developed and in development countries in order to validate these conclusions. Moreover, the implementation of a targeted program intervention for sleep quality should be analyzed longitudinally based on the collected data. As well, other variables as socioeconomic status and social roles could be analyzed in order to comprehend their effect on this relationship.

Declarations of interest: none

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7. Conclusões finais

A qualidade do sono pelo impacto que tem na qualidade de vida dos indivíduos representa uma prioridade na investigação científica. No entanto, apesar do interesse crescente pelas implicações do sono na saúde, as evidências empíricas com amostras não-clínicas são menos abundantes. Esta investigação teve como objectivo geral analisar o impacto da qualidade do sono nos indicadores de saúde mental (depressão, ansiedade e stresse) de uma amostra não-clínica, de forma a ampliar e desenvolver o conhecimento actual. De acordo com a revisão da literatura efectuada, considerou-se ainda fundamental averiguar o possível efeito moderador das variáveis "género", "idade" e "país".

Os dois primeiros estudos (1 e 2) apresentados nesta tese consistem em duas revisões sistemáticas que estabelecem a base da evidência científica na qual apoiámos a nossa investigação. Estes permitiram-nos recolher dados na literatura internacional da especialidade sobre a relação entre a qualidade do sono, a depressão, a ansiedade e o stresse.

Os resultados obtidos no Estudo 1 permitiram evidenciar um elevado número de associações entre a qualidade do sono e o stresse em amostras clínicas e não-clinicas. Observou-se também a influência de outros fatores nesta relação, tais como, fatores sociodemográficos (estatuto socioeconómico, idade e raça), níveis de ansiedade, depressão, fadiga, confusão, solidão e tabagismo. Neste contexto, sugere-se a importância do desenvolvimento de novos estudos que avaliem o efeito dos factores sociodemográficos, socioeconómicos e psicossociais nesta relação entre a qualidade do sono e o stresse.

No Estudo 2, os resultados alcançados apontam para a relação entre a qualidade do sono, a depressão e a ansiedade em amostras clínicas e não-clínicas. Foi ainda possível concluir que a investigação é mais frequente na análise desta relação em amostras clínicas. Este estudo também apresenta diferenças nas variáveis que influenciam esta relação em amostras clínicas e não-clínicas. Nas amostrass clínicas as variáveis com impacto nesta relação são maioritariamente as características psicossociais e os efeitos da doença, porém, nas amostras não-clínicas, os factores a considerar são os sociodemográficos e os socioeconómicos. Similarmente, os dados permitem concluir a necessidade de mais investigação dos diversos factores que afectam esta associação, de forma a ampliar o conhecimento científico sobre a qualidade do sono e a saúde mental em diversas populações.

Face aos resultados obtidos, optámos por focar os nossos estudos empíricos numa amostra não-clínica e nos factores sociodemográficos que poderão influenciar esta relação (i.e., género, idade e país) de forma a colmatar algumas das lacunas na investigação da qualidade do sono e a saúde mental.

Para prosseguir com o nosso objetivo principal, tornou-se imprescindível a validação do Índice de Qualidade de Sono de Pittsburgh (PSQI) para a população Portuguesa (Estudo 3). De acordo com a literatura científica investigada escolhemos validar um dos questionários mais utilizados globalmente para avaliar a qualidade do sono. Este estudo teve como objectivo validar o Índice de Qualidade de Sono de Pittsburgh (PSQI) para a população Portuguesa. Os resultados encontrados evidenciam que este questionário (PSQI-PT) é válido e confiável para analisar a qualidade de sono de uma amostra não-clínica. Este estudo de validação sugere que, na população Portuguesa, a idade e a educação influenciam a relação entre a qualidade do sono e a saúde mental.

A validação deste instrumento para a população portuguesa revestiu-se de grande importância para o nosso estudo. Dos dois instrumentos utilizados nesta investigação, o DASS-21 está validado para as três populações analisadas (Portuguesa, Espanhola e Brasileira), e o PSQI estava validado apenas para a Espanhola e Brasileira. Portanto, o interesse na validação para a população de Portugal. Todas as versões validadas destes instrumentos têm valores de consistência interna (α) de $\alpha \geq 0{,}70$. O PSQI é o questionário mais utilizado para avaliar a qualidade do sono, tendo já sido traduzido para mais de 40 idiomas. Embora já tenha sido validado para a população Brasileira, questões culturais e idiomáticas justificaram este trabalho de validação deste instrumento para a população portuguesa. Esperamos que venha a contribuir para um estudo mais aprofundado da realidade portuguesa, no que concerne à qualidade do sono. Na verdade, desde a sua publicação tem tido uma aceitação muito positiva por parte da comunidade científica em Portugal, bem como pela investigação a nível internacional (Manzar et al., 2018).

Após a validação do instrumento PSQI-PT reuniram-se as consições necessárias para dar continuidade ao estudo e responder às questões de investigação. O Estudo empírico 4 pretendeu analisar o impacto da qualidade global do sono avaliada pelo PSQI, e o possível efeito moderador do género, da idade e do país, na saúde mental de uma amostra não-clínica. Os resultados encontrados demonstram o impacto da qualidade global do sono nos três indicadores de saúde mental (i.e., depressão, ansiedade e stresse). No entanto, na análise do efeito moderador de género, idade e país, apenas o "país" demonstrou moderar a relação entre a qualidade do sono e a saúde mental. Mais especificamente, foram encontradas diferenças significativas na relação entre a qualidade do sono e a saúde mental nos participantes Espanhóis e Brasileiros, e Portugueses e Brasileiros, mas não entre Portugueses e Espanhóis. Também, e embora este estudo não tenha tido como objectivo a comparação de dados sobre a qualidade do sono entre países, observou-se que o Brasil apresentou a pior qualidade global do sono, seguido de Espanha e por último Portugal, com a melhor qualidade global do sono. Podemos concluir que, na nossa amostra, ter como país de origem Portugal, Brasil ou Espanha influencia o impacto que a qualidade do sono tem na saúde mental e ainda, a qualidade do sono.

Estes resultados corroboram a evidência científica actual da relação entre qualidade global do sono e saúde mental em populações não-clínicas. Também, suplantam este conhecimento ao comprovar que pertencer a um determinado país influencia esta relação.

Atestada esta relação e com vista a obter dados mais específicos sobre o modo como as várias componentes do sono se associam à saúde mental realizou-se o Estudo 5 – "Sleep quality components and mental health: Study with a non-clinical population". Este teve como objectivo avaliar o impacto individual das componentes do sono na depressão, na ansiedade e no stresse de uma amostra não-clínica, assim como o possível efeito moderador de género, idade e país nesta relação entre qualidade do sono e saúde mental. Os resultados obtidos confirmam que, das sete componentes do sono avaliadas através do PSQI, todas, à excepção da *qualidade subjectiva do sono,* têm individualmente impacto na saúde mental de uma amostra não-clínica. E, tal como com a qualidade global do sono, também a relação entre as componentes do sono e os indicadores de saúde mental é influenciada, apenas, pelo país de origem. Neste estudo verifica-se mais uma vez uma maior proximidade nalguns comportamentos relacionados com o sono, entre Portugal e Espanha, e mais diferenças entre Espanha e Brasil, e Portugal e Brasil.

De modo geral, os resultados dos estudos da tese comprovam a literatura encontrada e sobrelevam-na ao evidenciar o impacto individual das componentes do sono nos indicadores de saúde mental, e a importância do país de origem na relação entre a qualidade do sono global, e das componentes do sono, na saúde mental de uma amostra não-clínica. O sono é um comportamento complexo e essencial ao bem-estar dos indivíduos, que está intimamente ligado à saúde física e mental (João et al., 2016; João et al., 2018; Moyalleva et al; 2016). Mais especificamente, a qualidade do sono global tem um impacto na saúde mental de populações clínicas (Colagiuri et al., 2011; Kushnir et al., 2013; Palagini et al., 2014; Romito et al., 2014) e não-clínicas (Castro et al., 2013; Kalmback et al. 2014; Mellor et al., 2014; Carvalho Aguiar Melo et al., 2016). Este trabalho também se destaca pelo facto de ser ter analisado uma amostra não-clínica. Embora várias áreas da medicina e das ciências sociais procurem investigar dados mais normativos com o intuito de investir na prevenção da saúde (Buysse, 2014), na verdade a evidência científica encontrada é mais abundante na relação entre a qualidade do sono e a saúde mental em populações clínicas (João et al., 2016).

Nesta investigação, todas as componentes da qualidade do sono, com excepção da *qualidade subjectiva do sono*, têm um efeito na saúde mental, e este fez-se sentir principalmente pela *latência do sono* e pelos *distúrbios do sono.* Como já relatado anteriormente, a latência do sono (Ohayon & Roth, 2001) e os distúrbios do sono (Baldwin et al., 2010; Breslau et al., 1996; Ford & Kamerow, 1989) influenciam os níveis de depressão, ansiedade e stresse.

No entanto, embora se conheçam estudos que remetem para o papel das características sociodemográficas como a idade (Grandner et al., 2012; Kaplan et al.,

2017; Zeitlhofer et al., 2000) e o género (Arber et al., 2009; Chen et al., 2005; Mellor et al., 2014) na relação entre os aspectos do sono e a saúde mental, na nossa investigação apenas a variável "país" moderou esta relação.

O facto de nesta investigação a idade não influenciar o impacto da qualidade do sono na saúde mental da nossa amostra global, poderá ser explicado por esta ser uma amostra relativamente jovem, e segundo alguns autores, o papel da idade nos aspectos do sono, faz-se sentir primordialmente quando se comparam idosos e jovens adultos (Grandner et al., 2012), e, idosos e adultos na meia-idade (Kaplan et al., 2017). Também de relembrar como outros estudos sugerem que a influência da idade na qualidade do sono está relacionada com distintos factores, nomeadamente, a depressão (Roberts, Shema, & Kaplan, 1999), a avaliação objectiva ou subjectiva da qualidade do sono (Buysse, 2014; Kaplan et al., 2017), e a doença física (Davidson, MacLean, Brundage & Schulze, 2002; Smagula, Stone, Fabio, & Cauley, 2016), entre outros.

Do mesmo modo, uma explicação plausível para não se ter verificado o efeito moderador da variável "género" na nossa amostra, poderá dever-se ao facto de em sociedades desenvolvidas existir atualmente uma tendência para normalizar as oportunidades laborais, de educação e familiares, das mulheres. Este facto amenizará as diferenças nos papéis sociais e familiares das mulheres, e estes factores estão associados às diferenças de qualidade do sono entre géneros (Arber et al., 2009; Chen et al., 2005; Mellor et al., 2014).

A caracterização do comportamento "sono" e dos seus aspectos não obedece a uma norma universal, isto é, existem diferenças culturais na forma como se dorme e na qualidade do sono, e seus impactos no bem-estar das populações em países e culturas distintas (Worthman & Brown, 2014; Hollan, 2013; Ohayon, 2004). Esta tese atesta estes dados visto que a variável "país" modera a associação entre o comportamento sono e a saúde mental. Mais ainda, acrescenta conhecimento à investigação actual visto demostrar que o país de origem influência o impacto que a qualidade do sono tem na saúde mental dos indivíduos.

Todavia, os nossos estudos correspondem a investigações transversais que não nos permitem inferir relações de causalidade entre as variáveis. Assim, sugere-se o desenvolvimento de estudos futuros que permitam a análise longitudinal dos modelos apresentados neste trabalho. Também, e para além dos factores sociodemográficos já analisados, é importante entender o papel do estatuto socioeconómico e os papéis sociais no impacto da qualidade do sono sobre a saúde mental. Em períodos de incerteza social e económica, é decisivo compreender o quanto o poder aquisitivo e os papéis sociais dos indivíduos podem influenciar a forma como o sono se reflecte na saúde mental. Ainda, e face à corrente investigação sobre a cultura como factor importante nos aspectos do sono, é crucial concluir estudos com países desenvolvidos e em desenvolvimento de forma a poder comparar dados.

Com os resultados obtidos nesta tese pretende-se: a curto prazo, a) desenvolver campanhas de sensibilização para a saúde do sono e a saúde mental, contribuindo para a

qualidade de vida de populações clínicas e não-clínicas; b) promover o rastreio da qualidade do sono na região através de iniciativas organizadas para a detecção da doença e a promoção da saúde nos cuidados de saúde primários e em clínica; c) criar intervenções precoces para os problemas do sono e a saúde mental; a longo prazo, d) desenvolver tratamentos dirigidos às especificidades do sono dos indivíduos e das comunidades, atendendo às suas particularidades culturais e individuais; e, f) impulsionar políticas públicas no âmbito da saúde do sono e da saúde mental.

Consideramos que este trabalho contribui para o estudo da qualidade do sono e da saúde mental em populações não-clínicas, e promove a intervenção precoce na saúde do sono e na saúde mental. Salientamos também a revelação sobre o papel do país de origem na relação entre a qualidade do sono e a saúde mental, que, tanto quanto é do nosso conhecimento, ainda não tinha sido investigado. Esperamos que esta investigação seja útil para o desenvolvimento de futuros estudos sobre o sono, em países desenvolvidos e em desenvolvimento, de forma a delinear intervenções e tratamentos dirigidos a diferentes indivíduos e grupos.

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9. Anexos

Anexo A

Artigo 1: “Sleep quality and stress: A literatrure review”

https://www.researchgate.net/publication/301350658_Sleep_quality_and_stress_a_literature_review

Chapter IV

SLEEP QUALITY AND STRESS: A LITERATURE REVIEW

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***Abstract**: The present literature review aims to analyze the research published between 2005 and 2015 relative to the relationship between stress and sleep quality, using the Pittsburgh Sleep Quality Index (PSQI) as an instrument to assess the sleep aspects. This review was conducted in May 2015 based on the electronic databases Web of Science and EBSCO. We used the keywords "sleep quality" and "stress" focusing our target on empirical studies. After reading the collected studies (n=1267), only those who comprised adult samples were selected, resulting in a total of 15 studies. It was found that stress is associated with several individual factors, such as age, employment status, type of work, personality, level of education, and socio-economic status. When considering the use of the PSQI, stress also influenced the quality of sleep as a whole and in its specific components. Depression was considered important in stress relative to the sleep quality. Other relevant variables were the sociodemographic indicators and socioeconomic status. Therefore, it is essential to assess the context of stress and sleep quality so one can establish new explanations for their relationship and functions. In conclusion, it is necessary to develop thorough studies that take into consideration the importance of complementary variables, i.e., psychosocial, sociodemographic, and socioeconomic status, in the context of the quality of sleep. In this way, it will be possible to understand the effects of the quality of sleep in different samples.*

***Key-words**: literature review, PSQI, sleep quality, stress.*

INTRODUCTION

Sleep is a vital and complex physiological process inherent in each individual. In the last years, several studies (e.g., Nunes da Silva, Martins Costa, Waquim Machado, & Lopes Xavier, 2012) found that this process is affected by social, cultural, and environmental aspects. Nowadays, the demands that an individual experiences, especially from social and organizational contexts, have resulted in high levels of stress and poor sleep quality (Kurina et al., 2011). Moreover, organic disorders have contributed to an increase in the number of diseases associated with sleep quality (Carlson, Campbell, Garland, & Grossman, 2007). The risks associated with sleep disorders may include cardiovascular problems (Kashani, Eliasson, & Vernalis, 2012), cancer (Carlson et al., 2007), and metabolic disorders (Luyster, Strollo, Zee, & Walsh, 2012; Theadom & Cropley, 2008).

Anexo B

Artigo 2: “Sleep quality, depression and anxiety: A literature review”

https://www.researchgate.net/publication/318570686_Sleep_quality_depression_and_anxiety_a_literature_review

Chapter II

SLEEP QUALITY, DEPRESSION AND ANXIETY: A LITERATURE REVIEW

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Abstract: *This literature review aims to analyze the research published between 2011 and 2016 relating to the relationship between sleep quality, depression and anxiety, using the Pittsburgh Sleep Quality Index (PSQI) as an instrument to assess the sleep aspects. It was conducted in Feb 2016 in the electronic databases Web of Science (WoS) and EBSCO which were efficient tools to find the necessary heterogeneity for the selection of the relevant studies.*

After reading the collected studies (3477) only those that fulfilled the inclusion criteria were selected, resulting in a total of 32 studies. When considering the use of the PSQI, depression and anxiety influenced the quality of sleep as a whole and in its specific components. Also, it was found that sleep quality is associated mostly with socio-economic status and sociodemographic factors in non-clinical populations, and with psychosocial characteristics and disease outcomes in clinical-populations.

In conclusion, we highlight the need of further research on how sleep quality, depression and anxiety relate and on the moderating and mediating effect of other variables, i.e., psychosocial, sociodemographic indicators, and socioeconomic status, on this relationship, in different populations.

Key-words*: literature review, PSQI, sleep quality, depression, anxiety.*

INTRODUCTION

The complexity of sleep behaviour and its essential relation with quality of life is a matter of deep interest to science. Over the years the increasing need to assess which factors strongly influence the quality of sleep has grown (Becker, Jesus, João, Viseu & Martins, 2015) and although it is now possible to describe and interpret many of its biological mechanisms (Carter et al., 2012) and processes that lead to a good quality of sleep (Miró, Cano-Lozano, & Buela-Casal, 2005), much more has to be analysed in relation to sleep functions and outcomes.

Poor quality of sleep is essential for prime cognitive and psychological functioning (Waters & Bucks, 2011) and it may result on health impairments as, day time fatigue, mood disturbances, impaired memory and concentration (Colagiuri et al., 2011). Sleep disorders disrupt personal, family or social lives as well as damage professional productivity and increase the risk of accidents, health, welfare costs (Kyle, Morgan & Espie, 2010), and mortality risk (Buysse, Germain, & Moul et al, 2005).

Sleep quality is a multidimensional concept and self-report retrospective and prospective questionnaires like Pittsburgh Sleep Quality

Anexo C

Artigo 3: "Validation of the Portuguese version of the Psittsburgh Sleep Quality Index PSQI-PT"

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Validation of the Portuguese version of the Pittsburgh Sleep Quality Index (PSQI-PT)

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ABSTRACT

The present study was realised to validate the Portuguese version of the PSQI. The instrument PSQI-PT was applied to 347 Portuguese community-dwelling adults aged 18 69 years old. The resulting data was used to perform the psychometric analysis to validate the instrument. No structural modifications to the questionnaire were necessary during the adaptation process. The scores for the PSQI-PT showed an adequate internal consistency. The principal component analysis (PCA) produced good factor loading for all items. Finally, the analysis of demographic variables showed that age and literacy influence the values for the Global Sleep Quality (GSQ) in this Portuguese sample. In conclusion, this study demonstrated that the PSQI-PT is a valid and reliable instrument for the assessment of sleep quality with the advantage of allowing community-dwelling adults differentiation between good and poor sleepers.

1. Introduction

Sleep is a complex and dynamic behavioural state that greatly influences our waking hours and contributes to the body´s physical and mental recovery. Sleep disturbances currently prevail in society (Akerstedt and Nilsson, 2003). The most common sleep disorders are, namely, insomnia, restless legs syndrome, obstructive sleep apnea syndrome and shift wake sleep disorder. These are some of the main health complaints of clinical and non-clinical populations. In western countries the rates of self-reported insomnia range between 10% and 48% (Ford and Kamerow, 1989; Mellinger et al., 1985; Ohayon and Paiva, 2005; Ohayon and Smirne, 2002). In Portugal, 28,1% of the population of 18 and more suffer from insomnia symptoms at least three nights a week (Ohayon and Paiva, 2005). The United Kingdom has up to one-third of adults living with some sleep disturbance (Ohayon et al., 1997) and in the USA more than 60 million (Chilcott and Shapiro, 1996).

Sleep disturbances are frequently associated with other health impairments as, daytime fatigue, mood disturbances, impaired memory and concentration (Colagiuri et al., 2011a). There are other studies that relate poor sleep quality and psychiatric disorders (Baglioni et al., 2014a, 2014b), cancer (Colagiuri et al., 2011b; Fortner et al., 2002; Savard and Morin, 2001) and diabetes (Buxton et al., 2012; Pan et al., 2011; Reutrakul et al., 2013). Daytime sleepiness has been associated with increased risk of motor vehicle accidents, worse physical health, and increased mortality risk (Buysse et al., 2005). Thus, poor sleep quality and insomnia symptoms are associated not only with worse mental and physical health but as well with increased absenteeism from work and health care costs and utilisation. The cost estimates regarding sick days, treatment and other impacts on society are considerable (Léger et al., 2002). On the basis of data from the American Institute of Medicine (IOM), hundreds of billions of dollars per year are spent on direct medical costs related to sleep disorders (Reis, 2014).

Sleep can be assessed across self-report, behavioural, physiological, circuit, cellular, and genetic levels of analysis (Buysse, 2014) by using quantitative parameters such as sleep duration, sleep latency and number of awakenings, and qualitative parameters which are merely subjective (Bertolazi et al., 2011). Polysomnography and/or electroencephalographic spectral content analysis obtain objective measurements of sleep quality although they demand an extensive time commitment from patients andfinancial effort for researchers (Hita-Contreras et al., 2014).

Haponik et al. (1996)realised in their study that no physician of

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Anexo D

Questionário validado para a população portuguesa "Pittsburgh Sleep Quality Index – PSQI-PT"

Índice de qualidade do sono de Pittsburgh – versão portuguesa (PSQI-PT)

Nome:_____ Idade:_____ Data:____/____/____

*As questões a seguir são referentes à sua qualidade de sono apenas durante o **mês passado**. As suas respostas devem indicar o mais correctamente possível o que aconteceu na **maioria** dos dias e noites do último mês. Por favor responda a todas as questões.*

1) Durante o mês passado, a que horas se deitou à noite na maioria das vezes?
Horário de deitar:_____h_____min

2) Durante o mês passado, quanto tempo (em minutos) demorou para adormecer na maioria das vezes?
Minutos demorou a adormecer: _____min

3) Durante o mês passado, a que horas acordou (levantou) de manhã na maioria das vezes?
Horário de acordar: _____h_____min

4) **Durante o mês passado, quantas horas de sono por noite dormiu?** (pode ser diferente do número de horas que ficou na cama).
Horas de noite de sono: _____h_____min

Para cada uma das questões seguintes, escolha uma única resposta, a que lhe pareça mais correta. Por favor, responda a todas as questões.

5) Durante o mês passado, quantas vezes teve problemas para dormir por causa de:

a) Demorar mais de 30 minutos para adormecer:

( ) Nunca	( ) Menos de 1x/semana	( ) 1 ou 2x/semana	( ) 3x/semana ou mais

b) Acordar ao meio da noite ou de manhã muito cedo:

( ) Nunca	( ) Menos de 1x/semana	( ) 1 ou 2x/semana	( ) 3x/semana ou mais

c) Levantar-se para ir à casa de banho:

( ) Nunca	( ) Menos de 1x/semana	( ) 1 ou 2x/semana	( ) 3x/semana ou mais

d) Ter dificuldade para respirar:

( ) Nunca	( ) Menos de 1x/semana	( ) 1 ou 2x/semana	( ) 3x/semana ou mais

e) Tossir ou ressonar alto:

( ) Nunca	( ) Menos de 1x/semana	( ) 1 ou 2x/semana	( ) 3x/semana ou mais

f) Sentir muito frio:

( ) Nunca	( ) Menos de 1x/semana	( ) 1 ou 2x/semana	( ) 3x/semana ou mais

g) Sentir muito calor:

( ) Nunca	( ) Menos de 1x/semana	( ) 1 ou 2x/semana	( ) 3x/semana ou mais

h) Ter sonhos maus ou pesadelos:

( ) Nunca	( ) Menos de 1x/semana	( ) 1 ou 2x/semana	( ) 3x/semana ou mais

i)Sentir dores:

( ) Nunca	( ) Menos de 1x/semana	( ) 1 ou 2x/semana	( ) 3x/semana ou mais

j) Outra razão, por favor, descreva: _____
_____

Quantas vezes teve problemas para dormir por esta razão, durante o mês passado?

( ) Nunca	( ) Menos de 1x/semana	( ) 1 ou 2x/semana	( ) 3x/semana ou mais

6) Durante o mês passado, como classificaria a qualidade do seu sono?

( ) Muito boa	( ) Boa	( ) Má	( ) Muito Má

7) Durante o mês passado, tomou algum medicamento para dormir receitado pelo médico, ou indicado por outra pessoa (farmacêutico, amigo, familiar), ou mesmo por sua iniciativa?

( ) Nunca	( ) Menos de 1x/semana	( ) 1 ou 2x/semana	( ) 3x/semana ou mais

8) Durante o mês passado, teve problemas em ficar acordado durante as refeições, ou enquanto conduzia, ou enquanto participava nalguma atividade social?

( ) Nunca	( ) Menos de 1x/semana	( ) 1 ou 2x/semana	( ) 3x/semana ou mais

9) Durante o mês passado, sentiu pouca vontade ou falta de entusiasmo para realizar as suas atividades diárias?

( ) Nunca	( ) Menos de 1x/semana	( ) 1 ou 2x/semana	( ) 3x/semana ou mais

10) Vive com um(a) companheiro(a)?

( ) Não	( ) Sim, mas em outro quarto	( ) sim, no mesmo quarto mas, não na mesma cama	( ) sim, na mesma cama

Se tem um(a) companheiro(a) de cama ou quarto, pergunte-lhe se, no mês passado, **você teve**:

a) Ronco alto:

( ) Nunca	( ) Menos de 1x/semana	( ) 1 ou 2x/semana	( ) 3x/semana ou mais

b) Pausas longas na respiração durante o sono:

( ) Nunca	( ) Menos de 1x/semana	( ) 1 ou 2x/semana	( ) 3x/semana ou mais

c) Movimentos de pernas durante o sono:

( ) Nunca	( ) Menos de 1x/semana	( ) 1 ou 2x/semana	( ) 3x/semana ou mais

d) Episódios de desorientação ou confusão durante o sono:

( ) Nunca	( ) Menos de 1x/semana	( ) 1 ou 2x/semana	( ) 3x/semana ou mais

e) Outros sintomas na cama enquanto dorme, por favor, descreva:

_____

_____

Anexo E

Artigo 4: “The impact of sleep quality on the mental health of a non-clinical population”

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Original Article

The impact of sleep quality on the mental health of a non-clinical population

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ABSTRACT

Introduction: Sleep quality relates to mental health in clinical and non-clinical populations. However, there is more evidence of this relationship in clinical populations. Therefore, there is lack of evidence on how these variables relate and on which sociodemographic factors influence this relationship in non-clinical populations. In this study we hypothesize that in a non-clinical population sleep quality predicts mental health indicators and that age, country and gender moderate this relationship.
Methods: In a sample of 1552 subjects from Portugal, Spain and Brazil, self-reported sleep quality and mental health indicators were assessed through the Pittsburgh Sleep Quality Index and the Depression, Anxiety and Stress Scale-21, respectively. A multivariate linear regression model was used to test the research hypotheses.
Results: This adjusted model explained 10.1%, 12.3% and 13.1% of the variability of Depression, Anxiety and Stress, respectively, suggesting multiple sources of variance.
Conclusions: Our results confirmed that sleep quality predicts mental health in non-clinical populations, and that the variable country is a significant moderator of this relationship.

1. Introduction

Sleep is a biological periodic state of mind and body, critical to the maintenance of mental and physical health. Since the classic rats experiments conducted by Rechtschaffen and coworkers [1], sleep knowledge has evolved greatly in the last 30 years. The fact that the rats died after been deprived of sleep alerted the scientific community to the importance of understanding sleep and its effects. By 2014, the International Classification of Sleep Disorders (ICSD), had already listed more than 70 sleep-related disorders [2]. Léger and coworkers [3] in their international omnibus survey with 10,132 individuals (=5 years old), assessed that the prevalence of sleeping problems was 56% in the USA, 31% in Western Europe (France, Germany, Italy, Spain and the UK) and 23% in Japan.

Likewise, in Brazil the incidence of sleep problems is high, in a study with 2017 randomly selected individuals from 132 different cities, 76% suffered from at least one sleep complaint [4]. In Portugal, more than 28% of the population aged 18 and above suffer from insomnia symptoms at least three nights a week [5]. Nevertheless, some authors have proposed that different countries experience these sleep difficulties through different patterns of sleep, highlighting how cross-cultural contexts influence sleep behavior and perspective [6–9], thus suggesting that culture could relate to some aspects of sleep quality. Airhihenbuwa and coworkers [6]define culture as *the shared values, norms, and codes that collectively shape a group's beliefs, attitudes, and behavior through their interaction in and with their environments* . Thus, belonging to a certain country, within the same geographical boundaries and climate [10]sharing values [6]and a language [11] shapes the cultural context in which sleep occurs. Some studies have shown that sleep in terms of duration [7,8] and quality [8], as well as co-sleeping and napping [9]varies in different countries and cultures.

As Baglioni and coworkers [12] stated in their review it is common to associate a good-night of sleep with positive emotions and well-being during the day, the same way a poor night of sleep is related to higher irritability and negative emotions. Depression, anxiety and stress are mental health indicators highly prevalent in clinical and non-clinical populations which adversely impact quality of life [13]. Some of the latest studies have supported the role for sleep in regulating affective states, as moods or emotions

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