The impact of educational sessions on sleep on KU Leuven University students: an interview study

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Abstract

Background and objectives: Sleep is a fundamental human need for survival, health, and well-being. Significant biological and environmental changes occur during adolescence, which can have an impact on sleep patterns. Often, the first step needed for effective sleep management is sleep hygiene education.

This study examines the experiences and perceptions of students participating in sleep hygiene educational sessions at KU Leuven using interviews, with the aim of gaining insight into the reasons for attending these sessions, their thoughts on these information sessions, what they learned from them and finally whether they feel that there is an effect on their sleep and sleep habits.

Methods: We emailed a total of eight students who participated in these sessions, five responded to participate in our interviews. We then conducted five semi structured interviews about the informative session. We anonymized all collected data. We analyzed the data via thematic analysis. After initial coding, we restructured and discussed personal findings within the research group.

Results: The participants, who all struggled with a specific sleep problem, indicated that their motivation for participating varied from curiosity to actively searching for solutions to their problems. They all sought different kinds of help for their problem, such as a doctor's visit, a visit to a psychologist or medication. The session was generally positively received, with students appreciating the evidence-based information, but some indicated that the content was too general and not sufficiently personalized. Although the students learned several sleep hygiene strategies, such as limiting screen time before bed and optimizing the sleep environment, it proved difficult to consistently apply these recommendations in their daily lives. No significant improvement in sleep quality was reported after the session, highlighting the gap between knowledge and actual behavior change.

Discussion: The study highlights the value of sleep hygiene education, but suggests that additional strategies, such as follow-up sessions and motivational interviewing techniques, are needed to support lasting behavioral changes. The findings also point to the need to make the program more accessible to a wider range of students and on the other hand a more personalized approach, incorporating behavioral support to facilitate lasting change.

Abstract (Dutch)

Achtergrond en doelstellingen: Slaap is een fundamentele menselijke behoefte voor overleving, gezondheid en welzijn. Tijdens de adolescentie treden er belangrijke biologische en omgevingsveranderingen op die een invloed kunnen hebben op het slaappatroon. Vaak is de eerste stap die nodig is voor effectief slaapmanagement educatie over slaaphygiëne.

Deze studie onderzoekt de ervaringen en percepties van studenten die deelnamen aan educatieve sessies over slaaphygiëne aan de KU Leuven aan de hand van interviews, met als doel inzicht te krijgen in de redenen voor het bijwonen van deze sessies, hun gedachten over deze informatiesessies, wat ze ervan leerden en tot slot of ze het gevoel hebben dat er een effect is op hun slaap en slaapgewoonten.

Methoden: We mailden in totaal acht studenten die deelnamen aan deze sessies, vijf reageerden positief om deel te nemen aan onze interviews. Vervolgens voerden we vijf semigestructureerde interviews uit over de informatieve sessie. We anonimiseerden alle verzamelde gegevens en analyseerden de gegevens via thematische analyse. Na de eerste codering werden de persoonlijke bevindingen geherstructureerd en besproken binnen de onderzoeksgroep.

Resultaten: De deelnemers, die allemaal worstelden met een specifiek slaapprobleem, gaven aan dat hun motivatie om deel te nemen varieerde van nieuwsgierigheid tot het actief zoeken naar oplossingen voor hun problemen. Ze zochten allemaal verschillende soorten hulp, zoals een doktersbezoek, een bezoek aan een psycholoog of medicatie. De sessie werd over het algemeen positief ontvangen, waarbij de studenten de wetenschappelijk onderbouwde informatie waardeerden, maar sommigen gaven aan dat de inhoud te algemeen was en niet voldoende gepersonaliseerd. Hoewel de studenten verschillende slaaphygiënestrategieën leerden, zoals het beperken van schermtijd voor het slapengaan en het optimaliseren van de slaapomgeving, bleek het moeilijk om deze aanbevelingen consequent toe te passen in hun dagelijks leven. Er werd geen significante verbetering in slaapkwaliteit gerapporteerd na de sessie, wat de kloof tussen kennis en daadwerkelijke gedragsverandering benadrukt.

Discussie: Het onderzoek benadrukt de waarde van voorlichting over slaaphygiëne, maar suggereert dat aanvullende strategieën, zoals follow-up sessies en motiverende gesprekstechnieken, nodig zijn om blijvende gedragsveranderingen te ondersteunen. De bevindingen wijzen er ook op dat het programma toegankelijker moet worden gemaakt voor een bredere groep studenten, en tegelijkertijd dat er behoefte is aan een meer persoonlijke aanpak, met gedragsmatige ondersteuning om blijvende verandering te stimuleren.

1.Introduction

Sleep deprivation and the impact on University students

Sleep is a fundamental human need for survival, health, and well-being (1). Sleep deprivation therefore entails a lot of health risks. Insufficient sleep may contribute to chronic diseases, such as obesity, cardiovascular disease, and diabetes. However, because the majority of epidemiological research is observational, it is challenging to establish causation. This connection may have physiological causes, such as the nocturnal cycles of glucose metabolism and the hunger hormones (ghrelin and leptin), which can be disrupted by reducing sleep length, hence influencing calorie intake and utilization (1). Lack of sleep may also lead to mood disorders such as depression (through an increase in tension, anxiety, and fatigue) and reductions in cognitive performance, including memory and learning difficulties (2). And it can also contribute to workplace injuries, accidents, and medical mistakes since it impairs attention and slows reaction time during the day.

Insomnia disorder is a DSM-5 (Diagnostic and Statistical Manual of Mental Disorders, 5th ed.) diagnosis assigned to individuals who experience recurrent poor sleep quality or quantity that causes distress or impairment in important areas of functioning (DSM-V).

Significant biological, social, and environmental changes occur during adolescence (10–24 years), which can have an impact on behavior, sleep patterns, and overall health (3). It is known that these youths have a physiologic delay in the onset of sleep, which may cause them to stay up later (1). This is more often associated with older adolescents. The reason for this is a change in the two processes that are involved in sleep regulation (4): a) the intrinsic circadian timing system (a later phase of melatonin-secretion offset) and b) the homeostatic sleep-wake system (figure 1).

The circadian timing system (a)

The circadian timing system organizes temporal processes, such as feeding, reproduction, and sleep/wake cycles. These self-sustaining, synchronized temporal patterns, also known as circadian rhythms, oscillate every 24 hours. The human pineal gland secretes the hormone melatonin, which has a circadian pattern of oscillation. The daily fluctuation of light and dark is the main synchronizing stimulus for the circadian timing system. The hormone's levels are almost nonexistent during the day, increase in the evening close to bedtime, remain mostly stable at night, and decrease close to waking time. As melatonin is suppressed by light, light during the end of the daytime shifts circadian rhythms later. There is evidence from lab experiments that the circadian timing system changes during puberty.

Thus, the adolescent phase preference shift toward eveningness may be a sign of underlying modifications to the circadian timing system. Changes in light sensitivity may play a role in the developmental circadian and sleep behavior changes.

The homeostatic sleep-wake system (b)

The homeostatic sleep/wake system is thought to be mostly unaffected by circadian rhythms. The sleep-wake system can be simply described as follows: sleep pressure rises with increasing duration of wakefulness and falls with decreasing duration of sleep. Adolescents stay up later because they have less of a desire to go to sleep. Mathematical modeling of the build-up of sleep pressure over the sleep deprivation period indicated a slower build-up of sleep pressure in more mature adolescents (3). Hence, they have an overall shortened sleep duration, as the time required to rise for the lessons remains constant.

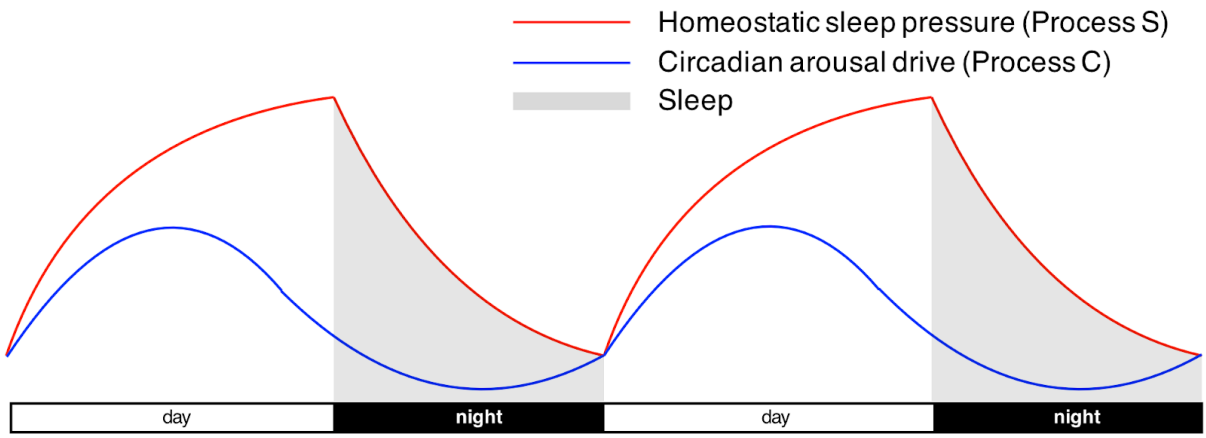


Fig 1. A schematic of the Two-Process Model of Sleep Regulation. Red lines represent the homeostatic sleep-wake system (Process S): sleep pressure accumulates during waking and dissipates during sleep. The intrinsic circadian rhythm (Process C) regulates the timing of sleep so that when sleep pressure surpasses an upper threshold, sleep is initiated and, when sleep pressure falls below a lower threshold, wake is initiated. So, the greatest urge to sleep is when the distance between process S and process C is the greatest.

From this schematic, one can understand that when we are for example awake for 24h in the morning, Process S is ready to go to sleep, so you can fall asleep very quickly, only to be awoken by your body clock a few hours later, because Process C wants to be awake (5). This phenomenon also explains jetlag. On the other hand, for example, behavior like daytime napping can reduce our sleep pressure and make it more difficult to fall asleep at night.

Apart from these biological changes, there is also the influence of external factors (6) including extracurricular activities, excessive homework load, and caffeine intake (7). College students have less regulated daily lives because of self-organized schedules. Evidence suggests that they frequently adopt an irregular sleep-wake cycle by getting little sleep during the week and waking up later on the weekends (8) as a result of factors like long study sessions and parties, among others.

In this group of young people, it is also important to give considerable thought to the usage of handheld media devices because it has become a crucial aspect of life. The effect that using technologies like tablets and smartphones has on this population group's ability to sleep has drawn more and more attention. According to a 2016 systematic review (9), access to and usage of these gadgets before bed were strongly linked to poor sleep quality, insufficient sleep quantity, and excessive daytime drowsiness. It is even associated with low academic performances (10). One possible reason for this is the blue light produced by smartphones which disrupts the melatonin production required for the natural sleep rhythm. Second, they may negatively affect sleep through directly delaying or interrupting sleep time. Additional reasons include the following (11): electronic media use before sleep may increase mental, emotional, or physiological arousal (for example by playing an exciting video game), and finally, incoming messages may wake adolescents up at night.

Although the harmful effects of sleep deprivation are becoming more widely recognized, there is a lack of research on educational initiatives that inform college students about the value of sleep and how to develop better sleep habits (12). The majority of large-scale public health education campaigns and initiatives were developed with an emphasis on nutrition and exercise, rather than sleep (2).

However, a number of strategies have already been proposed to reduce students' sleep deprivation. For instance, studies into starting classes later and websites (sleeptostayawake.org e.g.) about sleep education were created (12). Sleep education is often the first step required for successful management (1). The aim is to disseminate knowledge and effect a change in behavior.

We found a systematic review that investigated the effects of psychological interventions to improve sleep in students (13). Cognitive behavioral therapy (CBT), relaxation, sleep hygiene, and other psychological therapies were the four categories of psychological interventions that were found. For the outcome measures of sleep onset latency, sleep efficiency, waking after sleep onset, sleep hygiene, sleep quality, daily drowsiness, sleep disorders, and dysfunctional beliefs about sleep, the interventions demonstrated overall

medium to large effect sizes. Sleep length, sleep pattern, and mental health outcomes all showed small to medium impact sizes.

Cognitive behavioral therapy (CBT) enables you to identify and modify thoughts that interfere with your ability to fall asleep (14). This kind of therapy can assist you in managing or eliminating unfavorable ideas and anxieties that keep you up at night. The behavioral component of CBT assists you in creating healthy sleeping patterns and avoiding actions that interfere with your ability to sleep.

There is also the possibility of preventive information sessions about sleep hygiene. Sleep hygiene is the practice of engaging in sleep-promoting activities (keeping up regular sleep schedules) and refraining from sleep-depriving habits (watching movies, consuming foods high in caffeine, etc.). This is further investigated in this study. This kind of session is given at the KU Leuven by a clinical psychologist specialized in sleep. They last 1h15min, with time for questions. The target audience is actually every student at the KU Leuven. These are preventive sessions, as part of various informative sessions on healthy living. There are other sessions on alcohol use, exercise, healthy eating, and smoking. In other words, there should not necessarily be a lack of sleep among the students who can follow these sessions.

The aim of this study is not to investigate whether these sessions regarding sleep hygiene show an effect on sleep quality, but rather

1. what kind of students with what kind of sleep problems participate in these sessions and

2. what they themselves think of these sessions,

3. what they learn from it, and

4. whether they feel that their sleep is affected by it.

As it is the intention of the KU Leuven University to tell the students some basics amongst sleep and leave enough time for their own questions, the informative sessions do not follow a strict pattern of information. As such, it is possible that not every time the session is given, the same information is always told. The printout of the presentation can be found in the appendices.

The architecture of sleep

Sleep architecture refers to the basic structural organization of normal sleep (15). There are two types of sleep, non-rapid eye-movement (NREM) sleep and rapid eye-movement (REM) sleep. NREM sleep is divided into stages 1, 2, 3, and 4, representing a continuum of relative

depth. Each has distinct qualities, such as differences in muscle tone, eye movements, and brain wave patterns. Electroencephalographic (EEG) recordings were used to identify sleep cycles and phases by tracking the electrical activity of the brain.

NREM and REM sleep alternate cyclically during a sleep session. About 75–80% of the time that a person sleeps is spent in non-REM sleep (NREM sleep), with the remaining 20–25% being spent in REM sleep. In healthy people, REM sleep lengthens in the final third of the sleep episode and increases as the night goes on. Stage 2 starts to make up the majority of NREM sleep as the sleep episode goes on, and stages 3 and 4 may occasionally completely vanish.

Stage 1

Typically lasting 1 to 7 minutes during the first cycle, this stage accounts for 2 to 5 percent of total sleep time and can be quickly disrupted by loud noises. Stage 1 of the EEG shows a change in brain activity from low-voltage, mixed-frequency waves to rhythmic alpha waves, which indicate consciousness. Alpha waves have a frequency of eight to thirteen cycles per second and are linked to a relaxed, awake mood.

Stage 2

Stage 2 sleep lasts between 10 to 25 minutes during the first cycle and gets longer every cycle after that, making up 45 to 55 percent of the entire sleep episode. In order to wake up from stage 2 sleep, a person needs stronger stimulation than in stage 1. Sleep spindles and K-complexes are among the relatively low-voltage, mixed-frequency activity seen in the brain on an EEG. Sleep spindles are thought to play a key role in memory consolidation. When compared to a control group, individuals who learn a new activity have a considerably higher density of sleep spindles.

Stage 3 and 4

Slow-wave sleep (SWS) is the collective term for sleep stages 3 and 4, the majority of which take place in the first part of the night. Every one of them has unique qualities. Only a few minutes long, stage 3 makes up 3 to 8% of total sleep. Increased high-voltage, slow-wave activity is shown in the EEG.

Stage 4, the final NREM phase, lasts for roughly 20 to 40 minutes during the first cycle and accounts for 10 to 15 percent of total sleep. In stage 4, the arousal threshold is the highest of all the NREM stages. Increased levels of high-voltage, slow-wave activity on the EEG are indicative of this stage.

REM Sleep

Muscle atrophy, bursts of fast eye movements, and desynchronized (low-voltage, mixed-frequency) brain wave activity are characteristics of REM sleep. REM sleep is also characterized by slow alpha activity, theta activity (three to seven counts per second), and "sawtooth" wave patterns. The REM phase may only last one to five minutes during the first cycle, but as the sleep session goes on, it gets longer and longer.

Most typically, REM sleep is linked to dreams. Loss of reflexes and muscle tone probably has a purpose since it keeps a person from "acting out" their fears or dreams while they are asleep. Memory consolidation and the brain's processing of emotional information may also benefit from REM sleep.

Adolescence, a time of dramatic change in brain structure and organization, is a period in which sleep EEG also undergoes substantial change (3)**.** The most significant is the roughly 40% decrease in slow wave sleep (SWS) that occurs throughout the second decade of life. Although it doesn't drop as a percentage of total sleep time, REM sleep does diminish in absolute numbers. These EEG alterations seem to be connected to structural alterations in the teenage brain.

2.Material & Methods

2.1.The recruitment of participants

We recruited participants via KU Leuven. All of the selected participants followed the sessions in the weeks before the interview. The age of the participating students ranged from 18 to 24 years. Exclusion criteria consisted of age less than 18 years and age above 24 years. At the end of the information session, we asked who we could contact by email for an interview about this matter. We ended up emailing eight students. These eight students were present during the information session. Five of them responded and were interested to participate. After receiving a formal confirmation of participation, a concrete appointment in terms of place and time was scheduled. The interviews all took place between four and six weeks after the information session. To protect participant identities, we will use coded names when presenting the findings. The interviews were originally conducted in Dutch, so some subtleties may not be entirely preserved in translation.

2.2.Data collection

We (T.V.L. and S.V.) conducted semi structured interviews using an interview guide (see attachments). The participants were given the opportunity to express their own preference

regarding the interview format. We offered the possibility to choose between a face-to-face interview and an online interview via Microsoft Teams. All five participants chose an online interview and no one preferred to do a face-to-face interview. The interviews lasted between 17 and 32 minutes. Each interview was recorded and transcribed afterwards.

2.3.Data analysis

All collected data was anonymized. The methodology of thematic analysis was used. The interview transcripts were read repeatedly by each of the two researchers, simultaneously listening to participants' voices while writing down the interviews on paper. Inductive labeling of the interview fragments with codes and annotations was conducted separately to avoid influencing each other before discussing and matching our personal findings. After this initial coding process these codes and annotations were restructured and discussed within the research group. This resulted in greater, summarizing themes and subthemes. During the writing of the results, the interviews were frequently reread to make sure no important themes or particular nuances were missed.

2.4.Ethical considerations

The ethical approval for this study was obtained from the Ethics Committee Research UZ/KU Leuven with study number MP028246.

Participants signed informed consent after receiving extensive written and verbal information regarding the means and purpose of the study. Collected data was anonymized after conducting the interviews and no identifying data was logged.

3.Results

3.1.Description of the participants

	Interview 1	**Interview 2**	**Interview 3**	**Interview 4**	**Interview 5**
Age (years)	20	20	19	18	24
Sex	M	F	F	F	M
Code name	Aaron	Beth	Caroline	Daphne	Eric

Studies	Civil Engineering	Social Rehabilitation Sciences	Psychology	Language and Literature	Medicine

A total of five participants were interviewed, consisting of two men and three women, with ages ranging from 18 to 24. These adolescents were all students at the KU Leuven.

3.2.Thematic results

Five overarching themes were identified: reasons to participate in the educational session, the participants' thoughts regarding their sleep problems, search for help, what the participants tried to improve their sleep and thoughts about the educational sessions.

3.2.1.Reasons to participate in the educational session

Opportunistic participation

Exploring the reasons the students wanted to attend the educational sessions on sleep, it seems that participants did not expect much. They all told us they wanted to give it a chance. Beth for example noted "I thought: maybe I can go and listen."

Daphne told us something similar: "I'm going to see if it can teach me something."

Caroline added that she did not see a downside to participating, and therefore might as well just give it a chance: "I thought it wouldn't be harmful to learn a bit more about it, and that's why I participated with that idea in mind."

Eric agreed to this, and he added that he wanted to collect as much information about sleep as possible. He noted: "I just think it's good to gather as much information about sleep as possible."

Some participants also told us that one of their health care providers (such as their general practitioner (GP), psychologist) mentioned the educational session (see below).

A sleep problem

It soon became clear all participants did experience some kind of difficulty with sleeping. They all mentioned different difficulties though. The students seemed to be wondering how exactly this problem happened to them. Beth for example, questioned herself if she maybe

makes a mistake in her sleep routine: “I've actually needed a lot of sleep my whole life, and I thought maybe I am doing something wrong.”

The other participants experienced problems falling asleep, as Daphne stated it like this: “I've always had trouble falling asleep.”

Several others agreed with this and told us their stories about lying awake. Eric said he sometimes lies awake for two hours before he finally falls asleep, which he experiences as very frustrating. Aaron on the other hand also experienced difficulty staying asleep: “I sleep for 3 or 4 hours and then wake up and can't fall back asleep.”

3.2.2.The participants’ thoughts regarding their sleep problems

A clear reason for the sleep problem

As previously mentioned, all of the participants experienced a sleep problem. The adolescents gave several reasons for developing their sleep problem, going back to very different causes.

Aaron thought the reason for his waking up during the night might be a combination of two things. On the one hand, he admitted doing night work sometimes, which he felt has a bad effect on his sleep quality. On the other hand, he felt that when the heating is turned on during the night, this also affects his sleep in a bad way. He stated: “Now I'm pretty sure it's the heating too. Because a few times I forgot to turn the heating off before I went to sleep and then I woke up earlier.”

Caroline also saw a very clear reason for her problem.

> ‘When there is a lot of noise in my student house building, I have a lot of trouble with it and I do not sleep at all the night. So yes, especially that external noise plays a big role, because at home I do not have any trouble.’

Still, she doubted whether this was the only reason, because she knew there are students in the building who aren’t bothered by this noise issue. She thought stress might play a contributory role.

Daphne and Eric both thought stress is the main contributing factor to their sleep difficulties. Daphne talked about stressful periods during exams. She thought she puts more pressure on herself to sleep during this time of the academic year, because she has to get up early the next day to study. She said this gives her a feeling of loss of control and this makes her eventually just lie awake not being able to sleep. She tried to tell us what happens then:

> ‘When I see those hours passing by, I worry about it and sometimes I think: what time is it now? And then: shit, it's already half past two and I haven't slept yet. That gives me a kind of adrenaline and that makes me need even more time to calm down again.’

Eric, for his part, put it this way:

> ‘I think it started when I started studying. It often went hand in hand with periods of stress. The first year I studied medicine, so much came at me and suddenly there was a lot more material that I had to process in a short time. I think I had trouble falling asleep, especially during the exam period. I tried to relax after studying, but when you are stressed, that is less successful. I would go to sleep with stress and then falling asleep was not possible right away because you are still thinking about all sorts of things.’

For Beth, it was less clear what might be the reason behind her need for a lot of sleep. She admitted to having suffered from depression a few months before the educational sleep session. In her experience, this has made her need for lots of sleep even greater. She found it strange that her need for sleep was still greater than before, even though the depression was cured. She stated: “I was almost out of that depression and I thought: now I still need naps every day, I never had that before. So I'm doing something wrong, it can't be that I'm still this tired.”

Concerns about the sleep problem

A few of the participants worried about possible longer term disadvantages of bad sleep. Aaron for example was concerned that bad sleep quality can lead to permanent health effects. He said: “When I worked night shifts, I panicked a few times because I had read online that some people can have permanent effects from it. That’s also a big reason why I kind of stopped doing it.”

Most of the participants did not talk about long term disadvantages, but did fear the consequences for the next day(s) (see next subject: *Consequences of the sleep problems*); e.g. not being able to take an exam, being too tired, feeling irritated…

One participant even indicated that he thought his problem is not that special and he even seemed to want to put it into perspective. He thought a lot of people experience sleeping problems like he does. He noted: “I just kind of experience the things that a lot of people

experience. I notice that a lot of my friends experience the same thing. I think a lot of people experience something with sleep hygiene or something."

Consequences of the sleep problems

The students seemed to experience less or more the same immediate consequences when they sleep badly. They talked about feeling tired, sometimes to an extent that they couldn't go to class or felt very tired during the lessons. But on the other side, Caroline for example said her sleeping problem didn't really affect her studies. She said: "I have maybe once missed a class because of this, but otherwise it has not really affected my studies."

For Daphne, it seemed to be a bigger problem than missing a class just once. She had difficulty going to lessons early in the morning and tended to have a later day-night rhythm. She told us as follows:

> 'After a while I said: I'm not going to set an alarm clock anymore. So then I often woke up around half past nine or ten o'clock, which I wasn't really happy about because then you start your day relatively late. But I would rather have one lesson less and that I could get through the week than set an alarm clock. I tried to be in bed at twelve o'clock anyway, but then I often did not fall asleep.'

The fact that Daphne feels tired also led to feelings such as lack of motivation to do something, and for Aaron to a dip of energy in the afternoon. One very annoying (as they experience it) consequence that some of them tend to suffer from, is feeling irritated or being in a terrible mood to be around. Eric put it like this: "My concentration was also really poor when I slept so badly, so that first year was honestly a nightmare. My parents often said I was really unbearable during the exam period, probably a combination of poor sleep and stress."

Beth sometimes felt so tired that for her, taking a nap during the day was the only solution to being able to function the rest of the day. She said: "I always had to take a nap or I wouldn't get through the day. I really needed those naps."

As already mentioned, some of the participants saw stress as one of the main causes for their difficulties sleeping. The stress causes bad sleep and subsequently leads to more stress and finally more bad sleep. Caroline saw it as a self-fulfilling prophecy and put it into words very well:

> ‘The next day I have extra stress and I think: oh I did not sleep the night before, what if I do not sleep again? And that becomes a bit of a cycle. I slept badly night after night and then got even more stressed the next day.’

3.2.3.Search for help

Professional help

Before coming to the information session at KU Leuven, most participants had already sought help in another way. Only Aaron had not yet taken any further steps regarding his sleep problem. The informative session was his first time seeking external help.

The other adolescents all either visited their GP or a psychologist first, before they gave the session a chance. Beth for example already consulted a psychologist regarding her depression. When she discussed her sleep problem there, the psychologist referred her to her GP. Her family doctor recommended medication for her (see below). She did not go into the sleep problem in more detail with the psychologist.

Caroline, on the other hand, went to a psychologist specifically because of her sleep problem. She told us that her psychologist gave her some information about sleep and acknowledged Caroline’s problem. In addition, he/she referred her to the information session at KU Leuven.

Eric first went to his GP. He told us the following about it:

> ‘I went to the GP for this. My GP did a blood test, but that was completely normal. We also went into more detail about my sleep problem. That stress could be a possible cause of the problem because I sleep much better during the year than during the exam period. He said that I could possibly go to a psychologist for this, but I never did because the problem always went away when the exams were over or in a period with few deadlines.’

Daphne also consulted her GP first, but rather because she was ill at the time. She also mentioned during that consultation that she did not sleep very well. The doctor told her she could consider going to the educational session. Later she went back with her sleeping problem and at the same time with hair loss. It was then that the GP prescribed her medication (see below). But he also gave her other advice, as she told us:

> ‘He recommended working with rituals. That's a bit like pills, that you know: okay, I'll do that now and within an hour I'll go to sleep. Such a ritual is for example that I drink

a glass of milk or read a book, shutting myself off a bit from what I did during the day. That has never really worked super well.'

Medication

As already mentioned above, some participants were advised to take medication by their GP. Beth tried two types of medication, one of which she couldn't remember the name of. She told us she uses this medication only at times when she really can't sleep.

> 'There was a time when I slept really badly. My GP gave me Sedistress Sleep. It's over the counter, but I had to take it every day to be able to sleep. I still have it at home. And I also have, I've forgotten the name... It's something that's mainly meant to reduce panic, because I'm quite a panicky person. That was also to be able to relax, because I started to worry in the evening. But that was on prescription, I wasn't allowed to take it all the time because that would be addictive. But I do have medication to help me sleep when I can't.'

Daphne also took medication to sleep at one point, prescribed by her family doctor. She told us that she thinks it worked for her. In her opinion, this is because of the placebo effect of this medication.

> 'The doctor prescribed something for me: Lunestil. These are capsules and are herbal. It contains lavender oil, passion flower, a tiny bit of melatonin and vitamin B6. She then said: 'It's a small dose and it will help regulate the rhythm.' I took it towards the end of the exam period and I think it had a placebo effect. Normally there's nothing in it that can do any harm, and you do not need a doctor's prescription for it. I think it was also a mental thing. Like: you take that pill and then you have to stay awake for about an hour before you go to bed. That helped to prepare me mentally. Now I go to sleep with the feeling that I'm doing something about it.'

> 'Well, these aren't real sleeping pills. Still, they can help, if only because of the placebo effect and because they normalize your sleep pattern somewhat.'

Caroline did not receive doctor's advice to take medication, but rather went looking for medication herself.

> 'One time, when it was really bad, I went to the pharmacist and just asked, 'Is there some natural product I can take? It was called Dormixx. I took it a few times and the first time I felt like it worked because I believed in it so much. But later, after I took it

> and I felt like it wasn't really doing much, I stopped. It wasn't really doing much anyway.'

Eric, as a medical student himself, knew about medication that's used in patients with sleep problems, but did not want to try it himself. He explained:

> 'I have already learned in the lessons that there are a lot of natural medications for sleep problems but that they do not really help. I also know that you can become addicted to certain other medications so I wouldn't want to take medication for my sleep problem myself.'

3.2.4.What the participants tried to improve their sleep

Before the session

Prior to attending the educational session, the participating students had already experimented with various strategies to improve their sleep hygiene and, ultimately, their quality of sleep. Both Aaron and Eric attempted to set aside their smartphones well before bedtime, however, Aaron noted that this approach had little effect for him. He also tried going to bed exceptionally early, but this strategy did not work well, as he still lay awake for several hours. He stated:

> 'I tried to force myself to put my phone somewhere else a few times before, but I noticed that it did not really have any effect. [pause] Well, I've also had periods where I tried to get into bed around 7 p.m., which is very early, but that did not help much either because I was still awake until at least midnight.'

Beth, on the other hand, made an effort to stop studying on time and relax before bedtime by reading a book. She told us: "I made sure to stop studying at least an hour before bedtime and read a book instead. I still do that now."

As mentioned earlier, Caroline identified a specific cause for her sleep issue: too much noise in the student house building. She came up with the idea to block out this sound by wearing earplugs at night and using brown noise. When the noise levels were high and she struggled to fall asleep, she would feel extremely agitated and restless afterward. A friend recommended an app called 'Breathe' to help her relax through breathing exercises, which she found helpful. She put it this way: "So yes, I definitely use earplugs. I also tried 'brown noise,' which creates background noise that helps me focus, and that was helpful too."

Daphne expressed in the interview that she had been struggling with sleep issues for a longer time, which led her to try some strategies. As a child, she attempted to establish rituals, such as drinking a glass of milk or reading a book before bed, to help her unwind from the activities of the day. However, she felt that these practices did not provide much relief. As mentioned above, she believed that underlying stress contributed to her sleep problems, prompting her to focus on managing her stress more consciously and learning to let it go. For example, she started incorporating more relaxation breaks into her study routine. For a period, she also chose not to set an alarm in the morning, preferring to miss a class rather than compromise her week with inadequate sleep. She actively worked on fostering a positive mindset before sleep and comforting herself when she had a night of poor sleep. She explained us how she achieved this:

> ‘I really tried to change the mindset with which I went into the night: like, we’ll see how it goes, it’s also not a big deal if I sleep a bit less, there’s no pressure like: I have to get up, just trying to take the stress off in general. And yeah, being even more consciously kind to myself, like: it’s also okay if there was a rough day, it’s also okay if I have a bad night. It’s not the end of the world. The main thing is that it doesn’t become a vicious cycle, because I can handle one night of less sleep. I feel like that mindset had a generally positive effect.’

Eric tried to avoid drinking coffee after 4:00 p.m. and generally reduced his fluid intake after 7:00 p.m. to prevent nighttime bathroom visits. He also made a point to limit his screen time on his phone before going to bed.

After the session

Following the educational session, participants shared in the interviews that they have gained insights. Aaron, for instance, recalled the advice to use the bed exclusively for the 'three S's' (sleep, sex and sickness). He wrote this tip down and hung it in his room as a reminder. While he tried to follow it as much as possible, he admitted: “I still watch YouTube in bed, but much less than before.”

Eric also found this tip helpful: “I often used my bed to watch a series or review study material. I’m trying not to do that anymore.”

Caroline remembered the same advice but mentioned she was already following it: “Ah yes, that it’s useful to dedicate your bed solely to sleep, that was already the case for me, actually. When I study, I sit downstairs.”

Another change involved limiting screen time before bed. Beth noted:

> ‘I try to put my phone away when it gets dark in my room because of that blue light and how it’s not good for falling asleep... but I’m 20, you know how it is, it doesn’t always work out that well, but I’m working on it.’

Additionally, Aaron recognized the importance of maintaining a good sleep environment. He shared: “In the morning, a cold shower; in the evening, a warm shower. You need to keep your hands and feet warm, but your body should cool down at the beginning.”

This awareness extended to dietary choices, as participants expressed a commitment to avoiding energy drinks and cola in the late afternoon. One remarked: “I do think about it now when I drink cola, like: Oh, maybe not too late or something.”

Also Eric was trying to avoid this in the afternoon because of this session: “I was already aware of the effects of energy drinks, but if I were to have them while studying again, I would definitely avoid drinking them after noon.”

Aaron was surprised that there is caffeine in chocolate and tried to avoid that too before sleeping.

Lastly, participants emphasized the importance of becoming calmer before bedtime. One remarked:

> ’I hadn’t really thought about it, it was actually because of hearing it from others. But then in the presentation, something was mentioned about how it makes sense that if you’re stressed during the day, it’s also logical that you would be stressed in the evening and at night. Then I thought, ah, maybe that applies to me as well, that I experience a lot of stress during the day and so I’m not going to be super calm when it’s time to sleep. That was something new that I hadn’t thought of before, or something like that.’

Despite these insights from the sessions and the fact that they tried to apply some of this advice, the students felt that, while the information was interesting, it did not significantly impact their sleep habits. Aaron responded: “Oh no, not really, actually. Maybe I’m a bit less inclined to take naps, but I have still taken a few since then.”

Beth noted: “No, I’ve mostly kept doing the same things, or, well, kept them the same, and just, yeah, the thing about putting my phone away, it’s more on my mind now. Mainly that, really.”

Caroline added:

> ‘I think that the majority of the things that were mentioned in that regard weren’t really very useful for me, well, maybe not really applicable because that wasn’t the cause for me. I actually do not remember what else they said; it’s been a while.’

Eric also mentioned minimal changes to his sleep hygiene: “Not much has changed, but I do try to follow some of the small tips.”

3.2.5.Thoughts about the educational sessions

Positive points

Aaron found the session informative. He thought that attending this session is beneficial for all students, as many people face sleep-related issues. He expressed that such sessions can provide valuable information that all students can use. He stated: “I think that's something every student should know, it definitely doesn't hurt for everyone to attend a session like that once. I believe many people experience something related to sleep hygiene or something similar.”

The participants appreciated the professional quality of the information shared. Some of them already tried to search for more information about sleep hygiene but this session reassured them that the information is both reliable and scientifically grounded. Daphne put it this way:

> ‘I did find it useful to attend, also because the more you know about it and are informed, you know it’s professional. You can always gather bits of information here and there, but here you know what’s being said is accurate. I think it makes you more resilient for when things go badly, as you’ll have more background knowledge about how human sleep rhythms work.’

One participant emphasized that the insight that deep sleep does not always mean good sleep was an eye-opener. Participants also appreciated learning that it is normal to lie awake for about 30 minutes before falling asleep and that the amount of sleep hours varies from person to person. They found the information about different stages of sleep, including REM and NREM sleep, particularly interesting. This understanding, along with the distinction between deep and light sleep, contributed to their overall awareness of sleep processes. Daphne also mentioned that she was surprised by this: “I did not know, by the way, that your body first catches up on your physical deficit and only then the mental one.”

The opportunity to engage in conversations with others about sleep habits in the live session is seen as a positive aspect, with participants inspiring one another. Furthermore, the session provided new insights into the impact of daily stress on sleep, which many participants found relatable. Beth said: “I found the positive aspect was that you could also have conversations with the other people who were there. I think that hearing about other people's routines before sleeping can be quite inspiring.”

Negative points

Some participants felt that the information shared during the session was already familiar to them. For example, Beth mentioned: “Actually, I already knew most of the things that were discussed. I think that if you’re really focused on your sleep, you’re already familiar with everything that was mentioned.”

Caroline expressed a similar sentiment in her interview: “Maybe not very helpful in my situation. I do get that these tips could be useful if you're having trouble sleeping. Most of the tips I already knew, at least somewhat, but they do not really apply to me.”

There was a desire for more actionable advice. Although general sleep hygiene tips were offered, some students were looking for specific, practical strategies that they could apply right away to enhance their sleep. One student articulated this by saying:

> ‘Some sleep hygiene tips were provided, but I expected a bit more, like more concrete suggestions. However, I understand that it might not be realistic, as there isn’t a one-size-fits-all solution. But you still hope that maybe they’ve discovered a trick that always works well.’

Certain areas sparked particular interest, and participants wished the session had gone deeper. For example, questions arose around personalized sleep needs. Beth mentioned:

> ‘Uhm, I had maybe expected more something like… okay, they had said that it was normal that I need more sleep than someone else, but why that is exactly, or whether you can change that yourself, they kind of just skipped over that. I mainly thought: why is that normal?’

There was also interest in how different sleep habits or rhythms might affect others, like a partner. Aaron shared: “What about sleeping with your partner? How does that influence things? Positively or negatively, I would like to know that.”

During the session, the health effects and consequences of sleep deprivation were discussed, and participants found this information somewhat alarming. While they acknowledged the importance of addressing these issues, they felt that the manner in which it was presented could increase stress for attendees. Caroline noted:

> ‘It did surprise me a bit that they discussed that in the session, mentioning the consequences. I thought: "Oh, if people really have very serious sleep problems and attend the session, it might actually cause extra stress, like: oh no, all these consequences might happen to me now.” Yes, I maybe found it a bit frightening, but I do understand that they want to show the consequences.’

4.Discussion

4.1.Summary of the results

Striking is that all participants did not seem to expect too much from the informative session on sleep hygiene. They did not see their participation as a major obligation, but rather as an opportunity to learn something new or gather additional information. It could provide insight into how students generally view educational sessions on health and wellbeing: as an accessible opportunity to gain knowledge, without specific expectations. There is not much to be found in the literature on whether this is something generally known when participating in educational sessions.

Studies on health education in general show that participation based on noncommitment or curiosity can have seemingly positive effects, but that participants with stronger motivation or specific health goals often benefit more from the education (16). The expectation that there is “no harm” in participating could be linked to the concept of intrinsic motivation versus extrinsic motivation, as discussed in the Self-Determination Theory of Deci and Ryan, 1985. Intrinsic motivation is characterized by participating in behaviors due to motivations relating to the inherent satisfaction and interest in the behavior. On the other hand, extrinsic motivation refers to behavior performed to obtain an external reward or to avoid negative consequences. The motivation comes from outside, not from the activity itself. The Self-Determination Theory is very important in the context of health promotion and behavior change. For example, when it comes to health behaviors such as quitting smoking or improving sleep habits, someone who is intrinsically motivated (e.g., by the desire to be healthier) is likely to be more successful than someone who is motivated solely by external rewards (such as money or social approval) (17). Intrinsic motivation is associated with improved well-being and sustained behavioral change (18).

All participants, despite the session being intended for a broad audience, actually experienced sleep problems. It is not surprising that the participants all dealt with sleep problems. As mentioned earlier, research shows that sleep problems are common among college students, especially during the transition from adolescence to young adulthood (19). According to this study, 72% of college students experience poor sleep. This increased prevalence of sleep disorders in this age group is, as mentioned above, attributed to factors such as academic pressure, social obligations, and the use of electronic devices close to bedtime (6). Furthermore, it seems quite logical that when a session on sleep hygiene is being organised, mainly people with a complaint regarding this topic, will participate. But the KU Leuven actually wanted to organise these information sessions also for students without self-noted sleep difficulties.

The diversity of sleep complaints (difficulty falling asleep, difficulty sleeping through the night…) provides valuable insights into the variety of sleep problems that young people and students can experience.

The reason that's most mentioned in the interviews for their sleep problems is stress. Common knowledge has it that the stresses of daily life can perturb healthy sleep. What is it that really happens in sleep physiology after exposure to stressors? From polysomnographic studies, we now know more about the effect of diverse psychosocial stressors on polysomnographic measures of sleep (20). There are four main changes identified from these data: decreases in slow wave sleep, REM sleep, and sleep efficiency, as well as increases in awakenings. In this way, it is understandable that stress leads to bad sleep, which eventually leads to more stress and thus, more bad sleep.

In addition, participants like Caroline and Aaron cited external factors such as noise and night shifts as causes for their sleep problems. Noise pollution is a known cause of sleep disturbances and can contribute to poorer sleep quality (21). Aircraft, road, and rail traffic are the main sources of ambient noise, which contributes significantly to the disease burden in Europe. The World Health Organization (WHO) reported in 2011 that noise-induced sleep disturbances were responsible for 903,000 disability-adjusted life years lost per year in Western Europe alone, accounting for the majority of this illness burden.

Furthermore, irregular night shifts can disrupt the internal biological clock, leading to sleep problems and health risks, as we already explained in the introduction.

The last thing we need to discuss here is the relationship between depression and sleep, as this is another possible reason for the sleep problems mentioned by one of the participants.

Beth felt she needed more sleep since having suffered from depression, even after the depression was cured in her opinion. Insomnia is indeed among the most commonly reported residual symptoms during remission for major depressive disorder (22). Insomnia and mood symptoms are correlated in both directions; a major depressive disorder episode may be preceded by inadequate sleep, and a sad mood may interfere with regular sleep cycles. Depressed patients often have decreased REM sleep latency and prolonged REM sleep periods early in the night, leading to an overall increase in the proportion of REM sleep. The relative excess of REM sleep seems to come at the expense of slow wave sleep. This seems to possibly persist even after curation of depression.

There is also a degree of self-reflection shown by the participants, as seen in the quote from Beth, who asked herself if she maybe makes a mistake in her sleep routine and in the interview with Aaron who admits working at night sometimes. This suggests that students are aware of their sleep problems, but may not always know how to address them, which highlights the relevance of an educational session. The participants' self-reflection on their sleep problems is consistent with findings from health psychology, which state that people often unconsciously exhibit behaviors that negatively impact their health, such as maintaining irregular sleep schedules (23). There is evidence that sleep hygiene education can help participants become aware of these adverse behaviors and enable them to develop healthier sleep patterns (24).

The participants not only talked about the possible reasons for their sleep problems, but also thought about consequences. Participants reported feelings of fatigue, sometimes resulting in missing classes or decreased concentration during lectures. Sleep deprivation in adolescents is associated with concentration problems, memory impairment, and decreased academic performance (2). Some participants also experienced irritability and mood swings as a result of poor sleep. Sleep deprivation can lead to mood disorders and increased irritability (22).

Some adolescents seemed to worry about the short-term and long-term consequences from bad sleep, and to some extent, rightly so, because some of these consequences are well-documented in the literature. However, one of the participants put his sleep problems into perspective by stating that many people have similar experiences. This suggests a normalization of sleep problems among young people, which is concerning given the increase in sleep problems and psychological complaints in this group (19).

Most participants with sleep problems had already sought professional help before they attended the information session at KU Leuven. The help sought varied from consultations

with general practitioners (sometimes with a proposal to use medication) to sessions with psychologists. The participants' experiences show a variety of approaches and recommendations from health care providers when treating sleep problems. Some participants received recommendations for behavioral interventions, such as developing sleep rituals, while others were referred to additional resources or specialists. Participants who sought help from their GP or psychologist indicated that they were looking for a solution to their sleep problems, which is an important first step for many people with chronic sleep problems. This is consistent with literature showing that patients with sleep problems often first seek help from their GP, before being referred to specialized care, such as psychotherapy or sleep clinics (25). Psychologists and GPs indeed play an important role in the treatment of sleep problems, with psychological interventions, such as cognitive behavioral therapy for insomnia (CBT-I), often being the treatment of choice. On the other hand, some people do not consult any caregiver with sleeping problems, making it an underreported problem.

Some participants were prescribed medication by their GP. From what they said, we deduce that the participants were mainly prescribed over-the-counter drugs with natural ingredients such as lavender. Daphne also tried another kind of medication from which she forgot the name, but it seems she meant a benzodiazepine.

Not all participants were open to using medication, partly because of their knowledge of the limited effectiveness of natural remedies and the risk of addiction of some sleep medications, such as benzodiazepines. According to the 'Benzonet-study', performed by the University of Ghent, patients using benzodiazepines often know well about the negative health effects and fear the risk of addiction (26). This shows that there is both trust and reluctance among young people towards medication. Over the course of their lives, women are more likely than men to take sleep aids. The usage of sleep aids among all persons rises with age and falls with wealth (27).

The experiences from this study confirm what the literature suggests: the effectiveness of over-the-counter and natural sleep aids is limited (28). In addition, there is a risk of dependency with prescribed sleep medication, especially with long-term use (28). Alternative approaches, such as cognitive behavioral therapy for insomnia (CBT-I), are considered more effective than medication in the long term (13).

All the students who were interviewed had already tried to improve their sleep hygiene before the educational session and had some prior knowledge, but their efforts were not always effective. After the session, participants gained valuable insights into healthy sleep and

attempted to integrate these practices into their daily routines. The recommendation to use the bed exclusively for sleep, sex, and sickness (the 'three S's') was particularly memorable for several students. Additionally, they became more aware of their sleep habits, such as limiting screen time before bed, optimizing their sleep environment, and avoiding stimulants like caffeine in the evening. Several students found the deeper insights into the physiological aspects of sleep, for example REM and NREM cycles, particularly valuable, as these helped them better understand their own sleep patterns. This process reflects aspects of health literacy. Health literacy encompasses the ability to obtain, understand and apply health information to make informed decisions about one's well-being. Higher levels of health literacy are associated with improved self-care, better adherence to health recommendations, and a more proactive approach to health management. However, while health literacy facilitates behavior change, research suggests that additional factors are crucial in sustaining long-term changes (29).

The educational session on sleep hygiene was generally well-received by the interviewed students. They appreciated knowing that the information was evidence-based and reliable. By offering trustworthy, scientifically validated information, educational interventions can help bridge the gap for participants who are unsure about what constitutes reliable information and what does not. In a time when misinformation is widespread, providing clear, evidence-based information can empower students to make informed decisions.

Although students in this study reported gaining knowledge about sleep hygiene, they encountered barriers in consistently implementing these changes. For instance, Aaron acknowledged that he still watched YouTube in bed. This reflects broader challenges in bridging the gap between knowledge and behavior. Prochaska's Transtheoretical Model of Behavior Change describes behavior change as a staged process in which individuals progress through the phases of precontemplation, contemplation, preparation, action, and maintenance. After the session, Aaron likely found himself in the contemplation or preparation phase: he recognized the benefits of improving sleep and made small attempts to change but often reverted to old habits. Research has shown that individuals frequently struggle to transition from contemplation to action, as they acknowledge the benefits of change but still perceive significant obstacles (30).

These findings align with literature suggesting that while school-based sleep programs effectively increase sleep knowledge, they do not necessarily lead to sustained behavioral change. Behavioral change is influenced by multiple factors, including an individual's awareness of the consequences of their current habits, their perception of its significance in

their life, their willingness to modify their behavior, and their motivation to do so. Without these key elements, students may struggle to translate knowledge into lasting behavioral adjustments (31). Furthermore, some students in this study indicated that while they found certain recommendations interesting, they did not always perceive them as relevant to their personal situation. Others felt that the session primarily reinforced information they were already familiar with, which may have limited their engagement. Additionally, participants expressed a preference for more practical, immediately applicable advice. To better support students in translating knowledge into action, future educational sessions could incorporate elements of motivational interviewing, a technique that has been shown to promote behavior change in areas such as diabetes management, dietary adjustments, and smoking cessation (32).

Another notable aspect of the session was the opportunity for students to engage in discussions with peers about their sleep habits. Literature highlights that peer support and self-help groups can enhance patient engagement and self-management by providing opportunities for shared learning and social support. They emphasize that interventions facilitating active participation, rather than passive information delivery, tend to be more effective in improving health knowledge (29). Students in this study indicated that hearing about their peers' experiences was very interesting and made them reflect more on their own habits. To further leverage this social aspect of learning, future sleep hygiene programs could incorporate structured peer discussions or mentoring sessions where students exchange practical strategies.

Some participants found the discussion of the consequences of sleep deprivation distressing. It is important to strike the right balance between raising awareness of sleep-related risks and providing health information on sleep hygiene. The aim is not to increase participants' stress levels, as heightened stress, as previously mentioned, can itself contribute to sleep difficulties, potentially creating a vicious cycle (20).

4.2.Strengths and limitations of the study

One strength of our study was conducting semi-structured interviews, which allowed for flexibility. This approach enabled us to deviate from the pre-established guide when necessary, fostering unique and individualized conversations with each participant. As a result, no two interviews were identical, ensuring a rich diversity of insights and perspectives.

Furthermore, by allowing the adolescents to decide how they preferred the interview to be conducted, we aimed to create an environment in which they felt comfortable and at ease. All participants chose to conduct the interview online, which offered flexibility and comfort. On the other hand, a limitation of this approach is that the loss of non-verbal communication may have resulted in less depth in the conversations.

In addition, the interviews were conducted by two researchers, including one who was conducting semi-structured interviews for the first time. Although this interviewer had adequately prepared and received support and guidance from the more experienced researcher, the interview process may not have been executed flawlessly.

Additionally, the number of participants in the educational session was low (eight), which in turn limited the size of our interview sample. As stated before, some patients with sleep problems do not consult their caregivers (25). A key challenge for the future will thus be effectively reaching less motivated students who lack awareness of sleep hygiene and the habits that support healthy sleep. Due to the small sample size, it is not an ideal representation of the student population. The sample may not be diverse enough to accurately reflect the broader student body. Additionally, no distinction was made between on-campus and off-campus housing, or between graduate and undergraduate college students.

4.3.Implications for clinical practice and future research

The findings of this study highlight the importance of integrating sleep education into broader health promotion programs for university students. Given that all participants reported experiencing some form of sleep difficulties, it is crucial to recognize sleep problems as a widespread issue within this population. Universities and healthcare providers should consider implementing targeted interventions that extend beyond general sleep hygiene education.

A key takeaway is that while students appreciated the informative nature of the session, many expressed a need for more personalized and actionable advice. Future sleep interventions could benefit from follow-up sessions and the incorporation of motivational interviewing techniques to address individual barriers to behavior change. By using a more interactive, student-centered approach, sleep education programs could increase engagement and the likelihood of sustained behavior change.

Another important consideration is the timing of sleep education sessions. Although introducing them early in the academic year may seem ideal, this period is often overwhelming for students. It may be more effective to offer sleep interventions later in the year, once students have established their routines. Additionally, ensuring broad participation remains a challenge. The voluntary nature of the current program resulted in low attendance, yet making such sessions mandatory may be difficult to implement. Integrating sleep education into existing structures, such as orientation programs, could improve accessibility and participation.

Additionally, future studies could include a larger and more diverse sample, incorporating students from various educational backgrounds (graduate and undergraduate college students), age groups and living situations. This would allow for meaningful subgroup comparisons.

Lastly, to further enhance the quality of its sleep education sessions, KU Leuven could consider involving health professionals in the evaluation process, to ensure that the content is comprehensive, evidence-based, and aligned with current best practices in sleep hygiene education.

5. Conclusion

This study aims to explore the characteristics of students who participate in sleep hygiene educational sessions, their perceptions of these sessions, what they learn from them, and whether they feel these sessions influence their sleep.

First, the findings indicate that students who attend these sessions generally experience some form of sleep problem, such as difficulty falling asleep, difficulty getting up, long sleeping, light sleeping, or trouble sleeping continuously through the night. Their motivations for attending the session vary, ranging from general curiosity to actively seeking solutions for sleep-related concerns.

Second, participants generally perceived the sessions positively, appreciating the evidence-based nature of the information provided. They valued insights into sleep architecture, and perceived sleep hygiene tips, though some felt that the content was too general and not tailored to their individual concerns. They also expressed a desire for more actionable advice and a deeper exploration of personal sleep needs.

Third, students reported learning various sleep hygiene strategies, including limiting screen time before bed, optimizing their sleeping environment, and reducing stimulant intake.

However, while they found the information valuable, implementing these changes in daily life proved challenging. The gap between knowledge and behavior highlights the need for additional strategies.

Finally, participants did not report a significant change in their sleep following the session. Although they became more aware of their sleep habits, only minor adjustments were made. This suggests that while educational interventions increase knowledge, they may not be sufficient to drive lasting behavioral change without additional support, such as personalized follow-ups or motivational techniques.

In conclusion, sleep hygiene education appears to be a valuable tool for increasing awareness and providing students with strategies to improve their sleep. However, future interventions could benefit from a more personalized approach, incorporating interactive follow-up and behavioral support to facilitate lasting change.

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7.Appendix

Approval of Ethical Commission

GROEP BIOMEDISCHE WETENSCHAPPEN
HERESTRAAT 49, O&N II – BUS 700
BE-3000 LEUVEN

English version below.

Ons kenmerk: MP028246
Uw kenmerk: Masterproef studie: De invloed van een educatieve sessie over slaap en slaaphygiëne op adolescenten aan de KU Leuven: een interview studie
Leuven, 21-11-2023

GEEN BEZWAAR BRIEF

Geachte Professor Dr Marc Van Nuland
Geachte Tine Van Loo, Sander Vits

De Ethische Commissie Onderzoek UZ/KU Leuven bevestigt hierbij dat er geen bezwaren zijn tegen het uitvoeren van de voorgestelde studie, zoals ze werd beschreven in het protocol. De Commissie is van oordeel dat er vanuit ethisch standpunt geen bezwaren zijn bij de voorgestelde studie. De studie werd goedgekeurd op 21-11-2023

De Onderwijs-Begeleidings-Commissie voor Medische Ethiek (OBC) heeft in delegatie van het EC Onderzoek UZ/KU Leuven het vermeld protocol onderzocht en besproken op haar vergadering.

Deze studie betreft een prospectieve semi-gestructureerde interviewstudie naar slaap. Slaap heeft een belangrijke functie in de adolescentie, het stimuleert de groei en de cognitieve ontwikkeling. Daarom is het belangrijk om tijdig in de adolescentie op slaapproblemen in te grijpen. Onderzoek aan KU Leuven toont aan dat 45% van de studenten zware problemen ondervindt van slaaptekort en oververmoeidheid. Om dit te verbeteren worden educatieve sessies georganiseerd. De studie doelt om na te gaan of de educatieve sessie 'let's talk about sleep' een gezondheid bevorderend effect heeft op adolescenten. Semi-gestructureerd interviews (n = 10>, 1h) zullen worden afgenomen (online of fysiek). De geïnformeerde toestemming wordt op voorhand via mail aan de deelnemer bezorgd. Rekrutering via studentenmail uitnodigen tot deelname aan de studie. Er zullen transcripties genomen worden van de opgenomen mondelinge interviews. De transcripties zullen gelezen worden door elk van de twee onderzoekers. Alle verzamelde gegevens zullen geanonimiseerd worden voordat ze geüpload worden naar NVivo 12. Deze kwalitatieve analyse software zal worden gebruikt om de gegevens te beheren en te analyseren. De studie is goed uitgewerkt. Er zijn geen bezwaren.

EC Onderzoek heeft geen bezwaar tegen het project mits vertrouwelijke behandeling van de gegevens en naleving van de Belgische wetgeving omtrent privacy. EC wenst de hoofdonderzoeker/promotor van de studie te wijzen op zijn/haar verantwoordelijkheid betreft de privacy van de persoons-/patiëntgegevens bij contact met levende personen, patiënten en/of inzage in het elektronisch medisch dossier, inclusief de correcte implementatie hiervan door medewerkers en studenten.

Deze geen bezwaar brief betreft de indiening van 11-11-2023 en wordt gegeven voor de duur van de Masterproef van de betrokken student(en). Elke wijziging aan het protocol doet dit advies vervallen. U dient in dat geval tijdig een amendement voor advies voor te leggen aan de Onderwijs-Begeleidings-Commissie (OBC) die de initiële studie heeft geëvalueerd.

EC bevestigt dat ze werkt in overeenstemming met de ICH-GCP principes (International Conference on Harmonization Guidelines on Good Clinical Practice), met de meest recente versie van de

Verklaring van Helsinki en met de van toepassing zijnde wetten en regelgeving.

EC bevestigt dat in geval van belangenconflict, de betrokken leden niet deelnemen aan de besluitvorming omtrent de studie.

Met vriendelijke groet,

Prof. dr. Minne Casteels
Voorzitter
Ethische Commissie Onderzoek UZ/KU Leuven

Prof. dr. Pascal Borry
Voorzitter
Onderwijs-BegeleidingsCommissie voor Medische Ethiek KU Leuvenv

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Aandachtspunten (indien van toepassing)

EC benadrukt dat een GCP-opleiding van elke hoofdonderzoeker verwacht wordt. EC benadrukt tevens dat de hoofdonderzoeker/promotor verantwoordelijk is voor de uitvoering van het projectvoorstel in overeenstemming met de van toepassing zijnde wetten en voorschriften, waaronder, maar niet beperkt tot, de EU-verordening 2016/679 (Algemene Verordening Gegevensbescherming), de Belgische wet betreffende de rechten van patiënten van 22/8/2002, en het beleid van de instelling waar het onderzoek zal worden uitgevoerd.

Bij gebruik van elektronisch medische gegevens is een formeel akkoord van de dienstraad vereist. De opdrachtgever is verantwoordelijk voor de conformiteit van de anderstalige documenten met de Nederlandstalige documenten.

Dit advies van EC houdt niet in dat zij de verantwoordelijkheid voor de geplande studie op zich neemt. U blijft hiervoor zelf verantwoordelijk.

Bovendien dient u als hoofdonderzoeker erover te waken dat de resultaten van dit onderzoek, correct worden weergegeven in publicaties, rapporten voor de overheid enz.

U wordt eraan herinnerd dat bij klinische studies iedere door u waargenomen ernstige verwikkeling onmiddellijk zaan EC moet worden gemeld, ook al is het oorzakelijke verband met de studie onduidelijk.

Our reference: MP028246
Your reference: Master's thesis study: De invloed van een educatieve sessie over slaap en slaaphygiëne op adolescenten aan de KU Leuven: een interview studie
Leuven, 21-11-2023

Masterpaper protocol

GROEP BIOMEDISCHE WETENSCHAPPEN
HERESTRAAT 49, O&N II – BUS 700
BE-3000 LEUVEN

Template 2022.12

MASTERPAPER PROTOCOL: PROSPECTIVE STUDY USING A (SEMI-)STRUCTURED INTERVIEW

Belangrijke informatie met betrekking tot het invullen van deze template

Hoewel het formulier in het Engels is, kan de aanvraag zowel in het **Nederlands** als in het **Engels** worden voorbereid. De blauwe tekstvakken die uitleg bieden bij elk onderdeel mogen verwijderd worden bij het indienen van de aanvraag.

Hou het toelichtingendocument bij de hand terwijl je deze template invult. Alle nodige **informatie, voorbeelden en tekstsuggesties** bij de verschillende onderdelen staan in dat document (https://med.kuleuven.be/nl/obc/Documenten)

Elke **herindiening of amendement** moet in **'track changes'** of in **highlight** worden gemaakt zodat aanpassingen duidelijk zijn. Verder dient ook de bestandsnaam aangepast te worden naar 'herindiening_MP###_versie#' of 'amendement_MP###_versie#'. Het MP-nummer kan je terugvinden via SCONE (overzicht masterproef), het versienummer bepaal je zelf: te beginnen bij 1 en telkens met 1 te verhogen wanneer gevraagd wordt om nieuwe aanpassingen te doen.

Important information regarding this template and how to fill it in correctly

This application can be prepared in **Dutch** or in **English.** The blue text boxes with explanation can be deleted when submitting the application.

Read the explanatory document carefully when filling out this template. You can find all **information, examples and text suggestion** belonging to the various sections in this document. (https://med.kuleuven.be/nl/obc/Documents_en)

Every resubmission or amendment should be done in **'track changes' or in 'highlight'** in order to identify the changes. The file name must also be changed to 'resubmission_MP###_version#' or 'amendment_MP##_version#'. The MP-number can be found via SCONE (overview master thesis), the version number is up to you: starting at 1 and increasing by 1 each time you are asked to make new changes.

1. APPLICANTS

Protocol - full title	De invloed van een educatieve sessie over slaap en slaaphygiëne op adolescenten aan de KU Leuven: een interview studie
Version 1: Date submission	Date: ###
Version 2: Date resubmission	(to add in case of resubmission) Date:Click here to enter a date.
Version 3: Date third submission	(to add in case of third submission) Date:Click here to enter a date.

Principal Investigator – Promotor	**Name: Van Nuland Marc**
	Telephone: +32 495 237 252
	E-mail: marc.vannuland@kuleuven.be
Following both questions should be answered:	
The principal investigator is a health professional according to the Law of 10 May 2015. **YES** NO	
The supervisor has read and approved the submission for ethics approval. YES No	
Co-Investigator – Co-Promoter	**Name: Verbakel Jan**
	Telephone: +32 498 828 605
	E-mail: jan.verbakel@kuleuven.be
The co- investigator is a health professional according to the Law of 10 May 2015. **YES** NO	
Sub-investigator – Student(s)	**Name: Vits Sander**
	Student number: r0669938
	Telephone: +32492850032
	E-mail: sander.vits@student.kuleuven.be
	Name: Van Loo Tine
	Student number: r0676795
	Telephone: +32493727187
	E-mail: tine.vanloo@student.kuleuven.be

2. BACKGROUND AND RATIONALE

Explain the background and scientific relevance of the planned research. This should be done in a sufficiently elaborated way so that readers can get a sufficient understanding of the performed research in the area and the research questions of this project. References can be added at the end of this template.

Risicofactoren voor de ontwikkeling van chronische aandoeningen ontstaan en verergeren gedurende de jongvolwassenheid. De jongvolwassenheid vormt op dat vlak een kritieke en kwetsbare periode. Daarom zijn de psychologen verbonden aan de KU Leuven gestart in 2023 met het begeleiden van educatieve sessies rond vijf gezondheidsthema's: beweging, slaap, voeding, seksuele activiteit, alcohol en drugs. Iedere student aan de KU Leuven mag vrijblijvend aan deze sessies deelnemen, ongeacht of ze problemen ondervinden bij deze topics of louter preventief. Elke sessie duurt 1 uur en 15 minuten. In de eerste 45 minuten wordt er meer informatie gegeven over het onderwerp. De resterende 30 minuten worden voorzien om vragen te stellen. De sessies kunnen zowel live op de campus of online via teams gevolgd worden. Iedereen die ingeschreven is aan de KU Leuven kan zich inschrijven voor deze sessie via de website van KU Leuven (https://www.kuleuven.be/stuvo/kalender/welzijn-gezondheid)

We hebben gekozen om ons met de masterproef te focussen op één thema dat besproken wordt met de studenten, met name het thema rond slaap en slaaphygiëne. Slaap heeft een belangrijke functie in de adolescentie, het stimuleert de groei en de cognitieve ontwikkeling. (Bron: Colrain IM, Baker FC. Changes in sleep as a function of adolescent development. Neuropsychol Rev. 2011 Mar;21(1):5-21. doi: 10.1007/s11065-010-9155-5. PMID: 21225346; PMCID: PMC7543715) Anderzijds brengt slaaptekort verschillende gezondheidsrisico's met zich mee. Onvoldoende slaap kan op korte termijn het gebruik van roken, alcohol en marihuana doen toenemen bij adolescenten en op lange termijn kan het bijdragen aan de ontwikkeling van stemmingsstoornissen en van chronische ziekten, zoals obesitas, hart- en vaatziekten en diabetes. Daarom is het belangrijk om tijdig in de adolescentie op slaapproblemen in te grijpen. (Bron: Bruce ES, Lunt L, McDonagh JE. Sleep in adolescents and young adults. Clin Med (Lond). 2017 Oct;17(5):424-428. doi: 10.7861/clinmedicine.17-5-424. PMID: 28974591; PMCID: PMC6301929.) Onderzoek aan KU Leuven toont aan dat 45% van de studenten zware problemen ondervindt van slaaptekort en oververmoeidheid. Overdag komt deze vermoeidheid vaak tot uiting als problemen met concentratie en een verhoogde prikkelbaarheid. Als oorzaak van het 's nachts wakker liggen, geven de studenten voornamelijk stress en piekergedachten aan, maar ook nachtlawaai speelt een grote rol. Studenten vermelden ook dat het behalen van deadlines en het uitgaansleven in de studentenbuurt een grote rol spelen in het later naar bed gaan. (Bron: Caris Freya, Diallo Paul. Helft studenten kampt met een zwaar slaaptekort. Onafhankelijk studentenblad veto. 13 maart 2023. Jaargang 49 nummer 8).

In de educatieve sessie wordt er meer informatie gegeven over het belang van slaap met betrekking tot de gezondheid, de verschillende onderdelen van een nachtcyclus en worden er verschillende tips gegeven wat betreft slaaphygiëne. Enkele voorbeelden van deze tips zijn:

- Een optimale omgeving creëren in de slaapkamer: goede verluchting, donkere en stille kamer. Indien dit niet mogelijk is, eventueel oordopjes of een slaapmasker dragen
- Het bed alleen gebruiken om te slapen. Niet om te studeren, boeken te lezen of series te kijken,...
- Niet gaan slapen met een volle of lege maag, niet te veel meer drinken vlak voor bedtijd
- Geen koffie of cafeïne rijke dranken nuttigen na de middag want dit activeert het centraal zenuwstelsel en heeft dus een negatieve impact op de slaapkwaliteit
- Geen middagdutjes want dit is destructief voor het slaap-waakritme.

- Fysieke activiteit door de dag verbetert de slaapkwaliteit. Het vermindert ook de fysieke en emotionele stress, wat ook weer een positieve invloed heeft op mogelijke piekergedachten in de nacht.
- Schermactiviteit beperken voor het slapen gaan. Het blauwe licht zal het slaapinducerend hormoon tegenwerken en zal het dus moeilijker worden om in slaap te vallen.

Onze masterproef heeft als doel te onderzoeken of de educatieve sessie van KU Leuven rond slaap en slaaphygiëne een gezondheidsbevorderend effect heeft op het gedrag en de bewustwording van jongvolwassenen. Dit zal het eerste onderzoek zijn aan de KU Leuven dat het effect van deze educatieve sessie onderzoekt op het gezondheidsgedrag van jongvolwassenen. Indien de resultaten gunstig zijn, heeft dit zeker goede implicaties voor de praktijkvoering aangezien bijna de helft van de studenten aan KU Leuven problemen met slaap ervaren. Adolescenten die slaapproblemen ondervinden, kunnen dan mogelijk eerst via een educatieve sessie geholpen worden. Daarna kan gekeken worden of er eventueel nog extra hulp nodig is.

3. STUDY OBJECTIVES

Explain the aims and objectives of your study. Describe the research questions and hypotheses of your study.

De masterproef zal zich focussen op adolescenten, ingeschreven aan KU Leuven. Het heeft als doel te onderzoeken of de educatieve sessie van KU Leuven rond slaap en slaaphygiëne een gezondheidsbevorderend effect heeft op het gedrag en bewustwording van jongvolwassenen, meer bepaald zijn de adolescenten zich meer bewust geworden van het belang van slaap op de gezondheid en hebben ze iets aangepast aan hun slaaphygiëne. De informatie voor het ervaringsonderzoek zullen we verkrijgen via semi-gestructureerde interviews. Onze onderzoeksvraag luidt als volgt: **heeft de educatieve sessie 'let's talk about sleep' een gezondheidsbevorderend effect op adolescenten?**

4. RESEARCH METHOD

Present the interview and explain potential ethical implications of the planned methodology.

We zullen de deelnemers verschillende zaken bevragen aan de hand van semi-gestructureerde kwalitatieve interviews. We hebben de vragen opgedeeld in verschillende thema's met name:

- De reden van deelname aan de educatieve sessie
- Kennis omtrent slaap en slaaphygiëne
- Link met eigen ervaringen slaap
- Het nut van de sessie over slaap

De hoofdfocus van de vragen ligt vooral bij de bewustwording over de impact van slaaptekort op de gezondheid en op slaaphygiëne. We willen ook weten of ze deze sessie als nuttig hebben ervaren en of ze deze sessie zouden aanraden aan studenten met slaaptekort.

Voor de interviewleidraad: zie bijlage

Potentiële gevolgen van de methodologie: het onderzoek zal weinig ethische implicaties hebben. Het kan wel tijdrovend zijn voor de deelnemer. Een interview kan mogelijk 1 uur duren en kan als een belasting worden ervaren.

5. SELECTION AND WITHDRAWAL OF PARTICIPANTS

5.1 Inclusion and exclusion criteria

List details such as age, sex, disease, characteristics etc., under which a participant is deemed to be suitable (eligible) to participate in the study.

Om inzicht te verwerven op het effect van de educatieve sessie op het gezondheidsbevorderend gedrag van adolescenten worden minimaal 10 participanten geïncludeerd in de studie op basis van volgende criteria:

- Geslacht: man of vrouw
- Leeftijd: 18-26 jaar
- Studie: participanten moeten ingeschreven zijn aan de KU Leuven
- Deelname: ze moeten de sessie Let's talk about sleep minstens eenmaal gevolgd hebben op de campus of online via teams.

5.2 Sample size and population

Give the number of participants to be enrolled, together with the rationale for the sample size and how it relates to the total population. Does the ratio between sample size and population size makes it easy to identify participants? In case of working with a small population describe which measures will be taken to prevent re-identification.

Het totale aantal ingeschreven studenten aan KU Leuven in het academiejaar van 2022-2023 bedraagt 61.049 studenten. We verwachten dat de inschrijvingen in 2023-2024 en 2024 en 2025 in deze lijn zullen liggen.

De educatieve sessie 'let's talk about sleep' zal minsten vier maal per semester gegeven worden in het jaar 2023-2024. In het jaar 2022-2023 werden de sessies opgestart en namen er ongeveer 5 deelnemers per sessie mee. We verwachten dat het aantal deelnemers dit jaar hoger zal zijn omdat er meer reclame over gemaakt zal worden.

We hopen een tiental interviews af te nemen en te vergelijken.

5.3 Recruitment

Specify who will recruit the participants, how this will happen, and by whom the participants will be approached for inclusion and obtainment of the informed consent form.

We zullen de deelnemers via hun studentenmail uitnodigen tot deelname aan de studie. De onderzoekers of de begeleider die de sessie doceert, zal op het einde van de educatieve sessie de studie kort voorstellen en hen informeren dat ze via hun studentenmail een bericht zullen ontvangen voor vraag naar deelname. Wanneer de persoon toezegt zal een moment gepland worden waarop het interview zal plaatsvinden. Dit kan via een face-to-face interview of online. De geïnformeerde toestemming (ICF, toegevoegd als annex) wordt op voorhand via mail aan de deelnemer bezorgd. In deze ICF wordt duidelijkheid gegeven over de doelstelling, methode en implicaties van het onderzoek; de mogelijke voordelen, risico's, en nadelen verbonden aan de deelname; de mogelijke externe financiering van het onderzoek, de verwerking van de persoonsgegevens, alsook de bewaartermijn en opslag van deze gegevens. Ook wordt in het ICF expliciet vermeld of er al dan niet audio- en/of video-opnames zullen worden gemaakt tijdens het interview. Bij de start van het interview zal de onderzoeker de ICF nogmaals samen met de deelnemer overlopen. Enkel wanneer de deelnemer instemt met het interview en het ICF ondertekend terugbezorgt aan de onderzoeker, via mail of afgeleverd voorafgaand aan het interview, zal het interview van start gaan. Zowel in de ICF als bij de start van het interview wordt duidelijk vermeld dat de persoon in kwestie niet verplicht is om deel te nemen. Zowel voor het deelnemen als het niet deelnemen, als voor het vroegtijdig beëindigen van het onderzoek zijn er geen negatieve gevolgen voor de persoon in kwestie. Daarbij kan het interview op elk moment op vraag van de deelnemer worden beëindigd. De data - inclusief eventuele audio- en/of videofragmenten - van niet afgeronde interviews zullen niet worden opgenomen in de data-analyse en zullen worden vernietigd.

5.4 Expected duration

Specify the expected duration of the whole study, and define the beginning and ending of the study for the study participant.

De studie zal starten na goedkeuring van de ethische commissie en zal maximaal duren tot oktober 2025.

De schatting van de tijd die nodig zal zijn om een interview af te ronden is 30-60 minuten. Dit is de tijd die een deelnemer zal nodig hebben om deel te nemen aan ons onderzoek.

6. ANALYSIS

Describe methods for data analysis in detail. Describe the measures taken to avoid, or at least minimize, biases.

Er zullen transcripties genomen worden van de opgenomen mondelinge interviews. De transcripties zullen gelezen worden door elk van de twee onderzoekers. Alle verzamelde gegevens zullen geanonimiseerd worden voordat ze geüpload worden naar NVivo 12. Deze kwalitatieve analyse software zal worden gebruikt om de gegevens te beheren en te analyseren.
Inductieve labeling van de interviewfragmenten met codes en annotaties zal afzonderlijk worden uitgevoerd om te voorkomen dat de onderzoekers elkaar beïnvloeden alvorens de persoonlijke bevindingen te bespreken. Na het initiële codeerproces zullen deze codes en annotaties geherstructureerd zijn en besproken worden binnen de onderzoeksgroep. Dit zal resulteren in grotere, samenvattende thema's en subthema's.

7. DATA HANDLING AND MANAGEMENT

7.1 Data storage and management

Explain which type of data you are using, how the privacy of the participants is being protected (e.g. pseudonymisation or anonymization), how the data is safely stored, how the data is safely shared and what will happen to the data at the end of the project.

Alle data zullen tijdens het project vertrouwelijk en met de nodige zorgvuldigheid behandeld worden. In functie van onze onderzoeksvraag zal aan de hand van een interview informatie (zie interview punt 4) worden verzameld. Alles wat de participanten tijdens het interview vertellen, zal via geluidsopnames worden opgenomen. [Er zullen geen beelden worden gemaakt]. De opgenomen interviews zullen enkel worden beluisterd en uitgetypt door de onderzoeker(s). De interviewopnames, de dagboekgegevens, de persoonlijke notities van de interviewer zullen meteen na transcriptie worden vernietigd. Transcripties van de interviews zullen geen namen bevatten en evenmin andere gegevens die identificatie mogelijk maken. In de eigenlijke masterproef zullen enkele fragmenten van de interviews worden geciteerd op een anonieme wijze en op zo'n manier dat het op basis van een citaat niet mogelijk is om de uitspraak terug te leiden naar een bepaalde participant. De transcripties zullen bewaard worden in een beveiligd computerdocument dat enkel in het bezit is van de promotor(en) en de betrokken studenten. Indien mogelijk zal dit bestand bewaard worden in een project- of teamgebonden opslaglocatie op een server van KU Leuven of UZ Leuven, in OneDrive for Business, aangeboden door KU Leuven, of in REDCap. Zo niet, wordt een persoonlijke computer gebruikt die beveiligd is met een wachtwoord, tweestapsverificatie of gespecialiseerd programma zoals 7-Zip of AEScrypt. Bij het versturen van een kopie van vertrouwelijke informatie of documenten zullen deze steeds versleuteld zijn met een wachtwoord of unieke code. Voor het verzenden

van grote bestanden wordt gebruik gemaakt van Belnet Filesender. Toepassingen zoals Google Drive, een persoonlijke OneDrive (met uitzondering van OneDrive for Business, aangeboden door KU Leuven) of WeTransfer worden te allen tijde vermeden. Na afloop van het project zullen de bestanden met de transcripties aan de promotor worden bezorgd die verder zal instaan voor een veilige bewaring ervan. Conform het beleid van de KU Leuven zullen deze bestanden 10 jaar bewaard blijven, nadien wordt opnieuw geëvalueerd of het als zinvol wordt beschouwd om de data nog langer te bewaren.

Voor de verzameling en opslag van mijn data maak ik gebruik van (**duid aan wat van toepassing is**):

- Project- of teamgebonden opslaglocatie op de beveiligde server van KU Leuven of UZ Leuven via mijn promotor of begeleider
- REDCap, aangeboden door KU Leuven en UZ Leuven
- OneDrive for Business, aangeboden door KU Leuven
- **Persoonlijke computer, beveiligd met een sterk wachtwoord, tweestapsverificatie of gespecialiseerd programma (7-Zip, AEScrypt, …)**
- Andere, mits beargumentering, namelijk: ……..

7.2 Declaration of Confidentiality and Careful Management of Information and Personal Data

Please read carefully following section. By participating in this project you commit to following declaration.

In the framework of his / her Master's thesis, the student(s) will have access to all kinds of data, information, results and documents. In order to ensure the confidentiality of this Information and the privacy of those involved, within the framework of his / her Master's thesis the student(s) should always deal with the Information with the greatest care and discretion. In particular research related to patients and including the collection and analysis of personal data requires the utmost of care and discretion. Therefore, at all times the student must observe complete confidentiality with respect to the Information he / she has collected during the course of his / her Master's thesis.

In performing this research, the student(s) commit(s) him/herself to the following confidentiality obligations:

- *He / she accepts, during and after the completion of the Master's thesis, **the obligation to strictly observe the confidentiality of the Information he / she has collected** and the activities to which he / she has participated, and regarding the patients, healthy volunteers and the staff members with whom he / she comes into contact;*
- *He / she will only process and collect data that is **relevant** and **necessary** for his / her Master's thesis;*
- *He / she will **not share information** with persons not directly involved within the framework of his / her research; only the **investigator, possible group members** and his/her **supervisor** will have access to the data*

- *He / she will take **all necessary steps** to protect the confidentiality of Information and the privacy of those involved;*

- *He / she will handle with **care and responsibility** the Information and the access granted to him/her to information systems and digital media.*

- *He/ she will discuss the **confidentiality**, **storage** and **sharing** of files with his/her supervisor. He/she will use **anonymisation** or **pseudonymisation** in order to limit the risks of data leaks and data loss.*

- *If pseudonymisation is used, he/she will treat the pseudonymisation **key** or the **encryption table** containing the pseudonyms and the identifiable information fields with the **same confidentiality** as the original data. He/she will **never store the key or encryption table at the same device** (e.g. laptop or desktop) as the work file or database containing the pseudonymised data.*

- *Wherever possible, he/she will use a **project based or team based storage location** for storing and exchanging data. He/she will contact his/her supervisor to discuss the possibility of using an internal or external service of KU Leuven or UZ Leuven to save data. If not possible, he/she will use OneDrive for Business, provided by KU Leuven, REDCap,provided by KU Leuven and UZ Leuven, or a password protected device for storing collected data. Applications such as **Google Drive, a personal OneDrive** (except OneDrive for Business, provided by KU Leuven) **or WeTransfer will be avoided at all times**.*

- *He/she will always encrypt confidential information and files with a **password**, **two-step verification** or **specialized program** such as 7-Zip or AEScrypt.*

- *When sharing a copy of strictly confidential data, he/she will always **encrypt** the data with a secure password or unique code. For sharing large files, a **secure application** such as Belnet Filesender will be used.*

- *In the event of a **data breach** he/she will immediately contact his/her supervisor*

As this research is conducted in the context of a Master's Thesis, the legal basis for the processing of personal data is the public interest. This research will generate knowledge and new insights that (directly or indirectly) will benefit society.

All investigators shall treat all information and data relating to the study as confidential and shall not disclose such information to third parties or use such information for any purpose other than the performance of the study. The collection, processing and disclosure of personal data, such as participants' contact information, health information and medical information, is subject to compliance with the General Data Protection Regulation (GDPR).

When approval is given by the Ethics Committee, it is confirmed that the proposed processing of personal data meets the requirements of the GDPR. Consequently, from

a GDPR perspective, there is no objection to start the processing operations. When approval is given, this application will, In accordance with the GDPR, become included in KU Leuven's register of processing activities in the context of research and public service. ***No separate privacy application should be submitted for this type of studies.***

8. ASSESSMENT OF RISKS AND SAFETY

In case of safety issues (adverse events / serious adverse events) the student will promptly contact the Principal Investigator / Promotor who will be responsible for follow up. Please describe possible adverse events following your research and confirm that the name of the Principal Investigator and other relevant point of contacts have been integrated in the ICF to the participants.

In het ICF zal een aanspreekpunt vermeld worden voor vragen over de studie. Zowel de twee onderzoekers als de promotor zullen hierbij vermeld worden. Indien deelnemers een verder gesprek willen na deze educatieve sessie kunnen zij contact opnemen met het Studentengezondheidscentrum in de Naamsestraat 80 te Leuven. Dit zal ook vermeld worden in de informatiebrief. In het geval van 'adverse events' (= ongewenste gebeurtenis) wordt de promotor geacht deze op te volgen.

De ongewenste gebeurtenissen die kunnen optreden na de educatieve interventie zijn minimaal aangezien de gegevens van de deelnemers in de transcripties van de interviews geanonimiseerd zullen worden en geen andere gegevens die identificatie mogelijk maken. Het mogelijke verbonden risico is dat een deelnemer herkenbaar is in de resultaten van het onderzoek.

9. APPROVAL

Data can only be collected if the head of the institution or department where the data will be collected has been informed of the study and has approved the study. If applicable, please confirm this approval and give the essential contact information.

Hierbij bevestigen wij dat het verzamelen van gegevens wordt uitgevoerd met goedkeuring van het hoofd van de respectieve eenheid(en) of afdeling(en) waar het verzamelen van gegevens plaatsvindt.

10. PUBLICATION POLICY

Please read carefully following section. By participating in this project you commit to following declaration.

Publications will be coordinated by the Principal Investigator. Authorship to publications will be determined in accordance with the KU Leuven policy on authorship.

11. DIRECT ACCESS TO SOURCE DATA AND DOCUMENTS

Please read carefully following section

The investigator(s) and the institution(s) will permit study-related monitoring, audits, ethical review and regulatory inspections (where appropriate) by providing direct access to source data.

12. REFERENCES

Please add references here

- Colrain IM, Baker FC. Changes in sleep as a function of adolescent development. Neuropsychol Rev. 2011 Mar;21(1):5-21. doi: 10.1007/s11065-010-9155-5. Epub 2011 Jan 12. PMID: 21225346; PMCID: PMC7543715.)
- Bruce ES, Lunt L, McDonagh JE. Sleep in adolescents and young adults. Clin Med (Lond). 2017 Oct;17(5):424-428. doi: 10.7861/clinmedicine.17-5-424. PMID: 28974591; PMCID: PMC6301929.
- Caris Freya, Diallo Paul. Helft studenten kampt met een zwaar slaaptekort. Onafhankelijk studentenblad veto. 13 maart 2023. Jaargang 49 nummer 8

13. ANNEXES

1. *A template of the **ICF** has been developed and is available on https://med.kuleuven.be/nl/obc/Documenten or https://med.kuleuven.be/nl/obc/Documents_en. This must be used as a basis and adapted where necessary.*

   In case an alternative template is being used, a motivation should be provided here.
   Please copy your information letter here.

2. *Please add the **interview guideline**. An approval will not be given if an application doesn't contain the interview guideline.*

3. *Every **advertisement, flyer, poster**, etc. that will be used in the study should be added.*
   *If recruitment will be done through **social media** or by **mail**, please also add the text or illustration that will be used.*

4. *Other (if applicable)*

Informed Consent Form for Participants (Dutch)

KU LEUVEN

Exemplaar voor de deelnemer

Titel van de studie: De invloed van een educatieve sessie over slaap en slaaphygiëne op adolescenten aan de KU Leuven: een interview studie
Onderzoeksinstelling: KU Leuven
Ethisch comité: EC Onderzoek KU Leuven
Onderzoekers:
Sander Vits, ma-na-ma huisartsgeneeskunde, sander.vits@student.kuleuven.be
Tine Van Loo, ma-na-ma huisartsgeneeskunde, tine.vanloo@student.kuleuven.be
Marc Van Nuland, marc.vannuland@kuleuven.be

I Noodzakelijke informatie voor uw beslissing om deel te nemen

Inleiding

U wordt uitgenodigd om deel te nemen aan een onderzoek over de beleving van de infosessie "Let's talk about sleep" aan de KU Leuven. Om u te helpen beslissen of u al dan niet aan deze studie wenst deel te nemen, willen we u vragen even de tijd te nemen om onderstaande informatie voor deelnemers door te nemen, zodat u een welbewuste beslissing kunt nemen. Dit wordt een "geïnformeerde toestemming" genoemd.

Wij vragen u de volgende pagina's met informatie aandachtig te lezen. Hebt u vragen, dan kan u terecht bij de onderzoeker.

Dit document bestaat uit essentiële informatie die u nodig heeft voor het nemen van uw beslissing, uw schriftelijke toestemming en eventuele bijlagen waarin u meer details terugvindt over bepaalde onderdelen van de basisinformatie.

Als u aan deze studie deelneemt, moet u weten dat:

- Deze studie opgesteld is na evaluatie door de Ethische Commissie (EC) Onderzoek KU Leuven.
- Uw deelname is vrijwillig; er kan op geen enkele manier sprake zijn van dwang. Voor deelname is uw ondertekende toestemming nodig. Ook nadat u hebt getekend, kan u de onderzoeker laten weten dat u uw deelname wilt stopzetten zonder hiervoor een reden op te geven.
- De gegevens die in het kader van uw deelname worden verzameld, zijn vertrouwelijk. Bij de publicatie van de resultaten is uw anonimiteit verzekerd.
- Indien u extra informatie wenst, kan u altijd contact opnemen met de onderzoekers.

Doelstellingen en verloop van de studie

Deze studie heeft als doel te onderzoeken of de educatieve sessie "Let's talk about sleep" rond slaap en slaaphygiëne een gezondheidsbevorderend effect heeft op het gedrag en de bewustwording van jongvolwassenen.

Wij nodigen u uit om aan deze studie deel te nemen omdat wij geïnteresseerd zijn over wat u hebt bijgeleerd tijdens deze sessie, of u deze sessie als nuttig hebt ervaren en of deze sessie een verandering heeft teweeg gebracht omtrent uw kennis over slaap en slaaphygiëne.

Om aan deze studie te kunnen deelnemen, moet u een persoon zijn tussen 18 en 24 jaar. Alle participanten moeten ingeschreven zijn aan de KU Leuven en moeten de sessie "Let's talk about sleep" minstens eenmaal gevolgd hebben op de campus of online via teams.

De onderzoeker zal u vragen om deel te nemen aan een interview dat peilt naar uw ervaring over de infosessie "Let's talk about sleep". Deelname aan het interview zal ongeveer 15-30 minuten van uw tijd in beslag nemen en het interview zal online afgenomen worden of face-to-face in het Studentengezondheidscentrum (Naamsestraat 80, 3000 Leuven) of een plaats naar keuze. Tijdens het interview worden geluidsopnames gemaakt. De opnames zullen nadien enkel gebruikt worden voor transcriptie. Na transcriptie zullen alle beeld- en geluidsopnames vernietigd worden.

Beschrijving van de risico's en van de voordelen

Uw deelname aan deze studie houdt geen enkel gezondheidsrisico in.

U heeft zelf geen voordeel van deelname aan dit onderzoek. U kan wel door het delen van uw kennis en/of ervaringen, bijdragen aan dit wetenschappelijk onderzoek en de verbetering van de infosessie "Let's talk about sleep" aan de KU Leuven.

Intrekking van uw toestemming

U beslist zelf of u meedoet aan het onderzoek. Deelname is vrijwillig. Als u besluit niet mee te doen, hoeft u verder niets te doen. U hoeft niets te tekenen. U hoeft ook niet te zeggen waarom u niet wilt meedoen.

Als u wel meedoet, kan u zich altijd bedenken en toch stoppen, ook tijdens het onderzoek. U hoeft hiervoor geen reden te geven

Als u aan deze studie deelneemt, vragen wij om:

- Ten volle mee te werken voor een correct verloop van de studie.

Contact

Als u bijkomende informatie wenst, maar ook in geval van problemen of als u zich zorgen maakt, kan u contact opnemen met de onderzoekers (Van Loo Tine en Vits Sander) via (tine.vanloo@student.kuleuven.be en sander.vits@student.kuleuven.be) en de hoofdonderzoeker (professor Van Nuland Marc) via het telefoonnummer +32 16 37 72 91 (werkuren) of via e-mail (marc.vannuland@kuleuven.be).

KU LEUVEN

Als u vragen hebt met betrekking tot uw rechten als deelnemer aan de studie, kan u contact opnemen met de Ethische Commissie Onderzoek KU Leuven (ec@uzleuven.be; 016 34 86 00 (werkdagen tussen 10 en 11 uur))

KU LEUVEN

Titel van de studie: De invloed van een educatieve sessie over slaap en slaaphygiëne op adolescenten aan de KU Leuven: een interview studie

II Geïnformeerde toestemming

Deelnemer

Ik verklaar dat ik geïnformeerd ben over de aard, het doel, de duur, de eventuele voordelen en risico's van de studie en dat ik weet wat van mij wordt verwacht. Ik heb kennis genomen van het informatiedocument en de bijlagen ervan.

Ik heb voldoende tijd gehad om na te denken en indien gewenst met een door mij gekozen persoon te overleggen.

Ik heb alle vragen kunnen stellen die bij me opkwamen en ik heb een duidelijk antwoord gekregen op mijn vragen.

Ik begrijp dat mijn deelname aan deze studie vrijwillig is en dat ik vrij ben mijn deelname aan deze studie stop te zetten. Daarvoor hoef ik geen reden op te geven en ik weet dat er geen nadeel voor mij kan ontstaan.

Ik begrijp dat er tijdens mijn deelname aan deze studie gegevens over mij zullen worden verzameld en dat de onderzoekers de vertrouwelijkheid van deze gegevens verzekeren overeenkomstig de Europese en Belgische wetgeving ter zake.

Ik wil graag / Ik wil niet geïnformeerd worden over de algemene onderzoeksresultaten van de studie. Indien ja, voeg dan hier uw e-mailadres toe:

Ik heb een exemplaar ontvangen van de informatie aan de deelnemer en de geïnformeerde toestemming.

Naam, voornaam, datum en handtekening van de deelnemer

Onderzoekers

Ik ondergetekende Van Loo Tine en Vits Sander, onderzoekers, verklaren de benodigde informatie inzake deze studie mondeling te hebben verstrekt evenals een exemplaar van het informatiedocument aan de deelnemer te hebben verstrekt.

Wij bevestigen dat geen enkele druk op de deelnemer is uitgeoefend om hem/haar te doen toestemmen met deelname aan de studie en wij zijn bereid om op alle eventuele bijkomende vragen te antwoorden.

Wij bevestigen dat we werken in overeenstemming met de ethische beginselen zoals vermeld in de "Verklaring van Helsinki", de "Goede klinische praktijk" en de Belgische wet van 7 mei 2004 inzake experimenten op de menselijke persoon.

Naam, voornaam, datum en handtekening van de onderzoekers

KU LEUVEN

Titel van de studie: De invloed van een educatieve sessie over slaap en slaaphygiëne op adolescenten aan de KU Leuven: een interview studie

III Aanvullende informatie

1: Aanvullende informatie over de bescherming en de rechten van de deelnemer

Ethisch comité

Deze studie werd geëvalueerd door een onafhankelijk ethisch comité, namelijk EC Onderzoek KU Leuven, dat een gunstig advies heeft uitgebracht. De ethische comités hebben als taak de personen die aan studies deelnemen te beschermen.

U dient het positief advies van de Ethische Comités in geen geval te beschouwen als een aansporing om deel te nemen aan deze studie.

Vrijwillige deelname

Aarzel niet om alle vragen te stellen die u nuttig vindt voordat u tekent. Neem de tijd om er met een vertrouwenspersoon over te praten, als u dit wenst.

U heeft het recht om niet deel te nemen aan deze studie of met deze studie te stoppen zonder dat u hiervoor een reden hoeft te geven, zelfs al hebt u eerder toegestemd om aan deze studie deel te nemen. Uw beslissing zal in geen geval nadelige gevolgen hebben voor u.

Als u aanvaardt om aan deze studie deel te nemen, ondertekent u het toestemmingsformulier. De onderzoeker zal dit formulier ook ondertekenen en zal zo bevestigen dat hij u de noodzakelijke informatie voor deze studie heeft gegeven. U zult het voor u bestemde exemplaar ontvangen.

Kosten in verband met uw deelname

U zult geen vergoeding krijgen voor uw deelname aan deze studie. Uw deelname zal echter voor u geen bijkomende kosten met zich meebrengen.

Vertrouwelijkheidgarantie

Uw deelname aan de studie betekent dat de onderzoekers gegevens over u verzamelen en gebruiken voor onderzoek en in het kader van wetenschappelijke en medische publicaties.

Uw gegevens zullen worden verwerkt overeenkomstig de Europese Algemene Verordening inzake Gegevensbescherming (AVG) en de Belgische Wetgeving betreffende de bescherming van natuurlijke personen met betrekking tot de verwerking van persoonsgegevens. KU Leuven is de verwerkingsverantwoordelijke voor uw gegevens.

U hebt het recht om aan de onderzoekers te vragen welke gegevens zij over u hebben verzameld en waarvoor ze gebruikt worden in het kader van de studie. U hebt het recht om deze gegevens in te kijken en om verbeteringen te laten aanbrengen indien ze foutief zouden zijn[1].

---

1 Deze rechten zijn bepaald door de Europese Algemene Verordening Gegevensbescherming (AVG), door de Belgische Wetgeving betreffende de bescherming van natuurlijke personen met betrekking tot de verwerking van persoonsgegevens en door de wet van 22 augustus 2002 betreffende de rechten van de patiënt.

De onderzoekers zijn verplicht om deze verzamelde gegevens vertrouwelijk te behandelen.

Dit betekent dat zij zich ertoe verbinden om uw naam nooit bekend te maken in het kader van een publicatie of een conferentie en dat zij uw gegevens zullen coderen (uw identiteit zal worden vervangen door een identificatiecode in de studie). De overgedragen persoonlijke gegevens omvatten geen combinatie van elementen waarmee het mogelijk is u te identificeren [2].

De (gecodeerde) onderzoeksgegevens kunnen doorgegeven worden aan Belgische of andere regelgevende instanties, aan de ethische comités, aan andere onderzoekers en/of instellingen die samenwerken met de opdrachtgever. Dit gebeurt dan steeds in gecodeerde vorm.

De opdrachtgever verbindt zich ertoe om de verzamelde gegevens enkel in het kader van deze studie te gebruiken.

Indien u uw toestemming tot deelname aan de studie intrekt, zullen de gecodeerde gegevens die al verzameld waren vóór uw terugtrekking, bewaard worden. Hierdoor wordt de geldigheid van de studie gegarandeerd. Er zal geen enkel nieuw gegeven aan de opdrachtgever worden doorgegeven.

Indien u vragen hebt over hoe wij uw gegevens gebruiken of uw recht op inzage, correctie, eventueel stopzetting van de verdere verwerking wil uitoefenen, dan kan u hiervoor steeds terecht bij uw arts-onderzoeker op volgend contactadres: Kapucijnenvoer 7 blok h - bus 7001 3000 Leuven. Indien u naderhand nog bijzondere aandachtspunten heeft of klacht wenst neer te leggen, kan u terecht bij het privacyteam van de KU Leuven op privacy@kuleuven.be

Tot slot, indien u een klacht heeft over de verwerking van uw gegevens, kunt u contact opnemen met de Belgische toezichthoudende instantie die toeziet op de naleving van de grondbeginselen van de bescherming van persoonsgegevens:

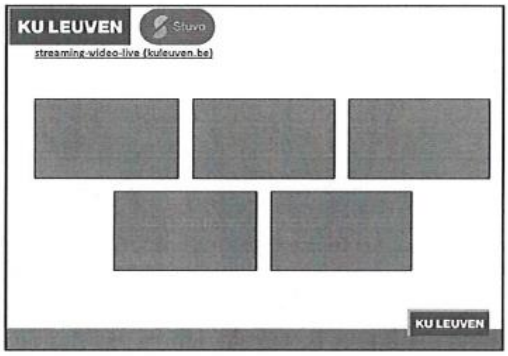
De Belgische toezichthoudende instantie heet:
Gegevensbeschermingsautoriteit (GBA)
Drukpersstraat 35,
1000 Brussel
Tel. +32 2 274 48 00
e-mail: contact(at)apd-gba.be
Website: www.gegevensbeschermingsautoriteit.be

[2] De database met de resultaten van de studie zal dus geen elementen bevatten zoals uw initialen, uw geslacht en uw volledige geboortedatum (dd/mm/jjjj).

Powerpoint Presentation



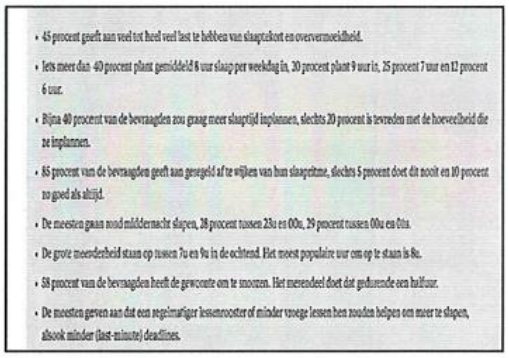
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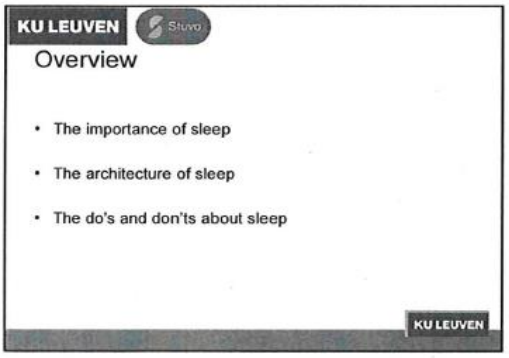
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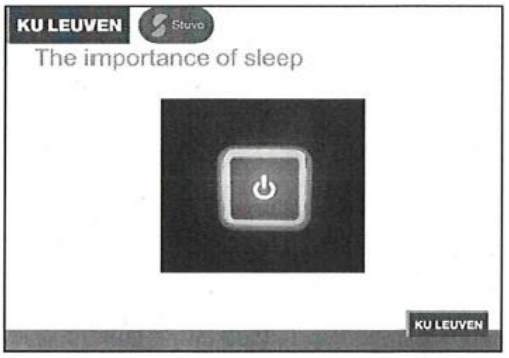
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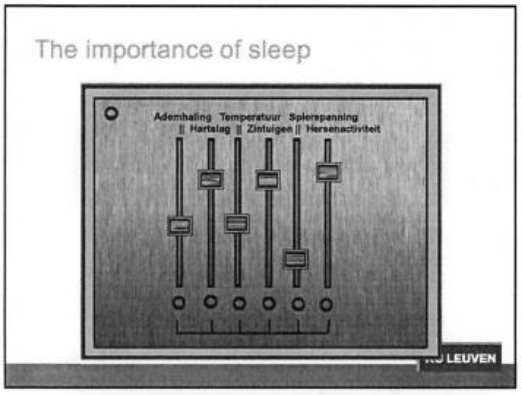
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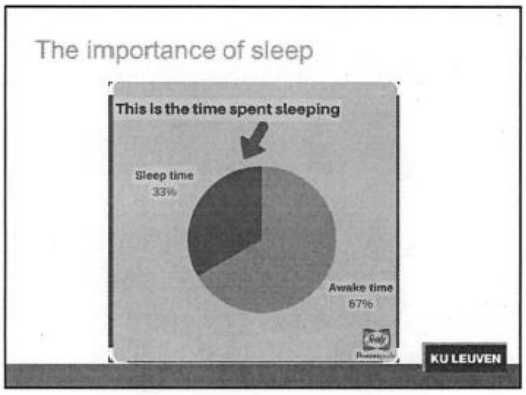
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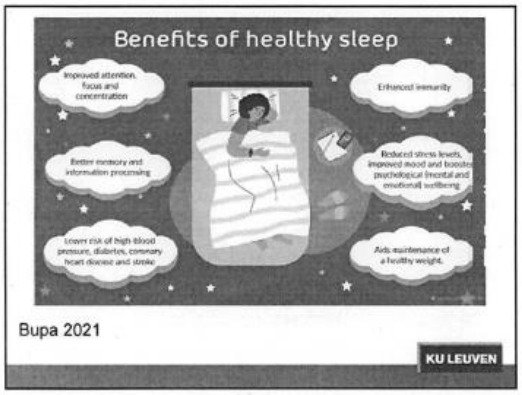
6


The importance of sleep
Ademhaling Temperatuur Spierspanning
Hartslag Zintuigen Hersenactiviteit
KU LEUVEN

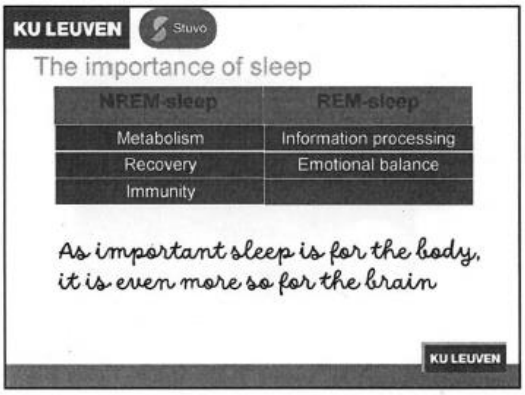
7


The importance of sleep
This is the time spent sleeping
Sleep time
33%
Awake time
67%
KU LEUVEN

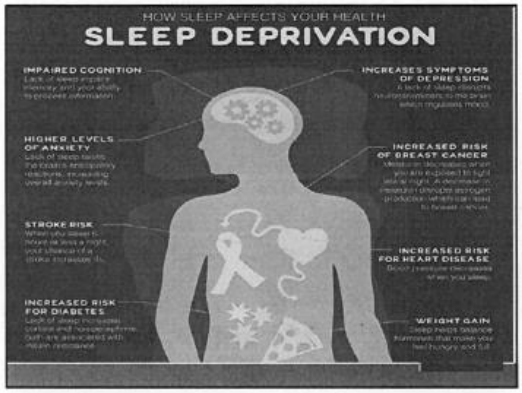
8


Benefits of healthy sleep
Improved attention, focus and concentration
Enhanced immunity
Better memory and information processing
Reduced stress levels, improved mood and boosted psychological (mental and emotional) wellbeing
Lower risk of high blood pressure, diabetes, coronary heart disease and stroke
Aids maintenance of a healthy weight
Bupa 2021
KU LEUVEN

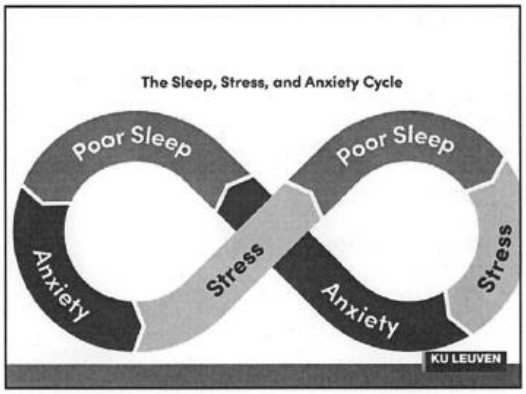
9


KU LEUVEN
Stuvo
The importance of sleep
NREM-sleep
REM-sleep
Metabolism
Information processing
Recovery
Emotional balance
Immunity
As important sleep is for the body, it is even more so for the brain
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10


HOW SLEEP AFFECTS YOUR HEALTH
SLEEP DEPRIVATION
IMPAIRED COGNITION
INCREASES SYMPTOMS OF DEPRESSION
HIGHER LEVELS OF ANXIETY
INCREASED RISK OF BREAST CANCER
STROKE RISK
INCREASED RISK FOR HEART DISEASE
INCREASED RISK FOR DIABETES
WEIGHT GAIN

11


The Sleep, Stress, and Anxiety Cycle
Poor Sleep
Poor Sleep
Anxiety
Stress
Anxiety
Stress
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12

Functions of sleep

- NREM — BODY
  - Metabolic changes
    ENERGY
  - Hormonal changes
    RECOVERY
    - ↑ growth hormone
    - ↓ adrenaline and cortisol
    - ...
  - Immunologic changes (Ab)
    IMMUNITY

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13

Functions of sleep

- REM — MIND
  - Information processing
    - Consolidation and integration of important information
    - Verwijderen van onbelangrijke informatie
  - Emotional balance

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14

KU LEUVEN Slaap

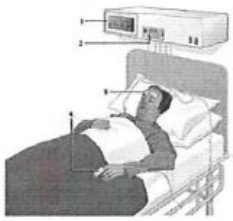
Overview

- The importance of sleep
- The architecture of sleep
- The do's and don'ts about sleep

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15

The architecture of sleep



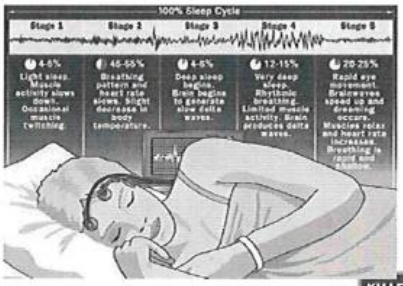
POLYSOMNOGRAPHY

- EOG
- EMG
- EEG
- ECG
- Oxygen
- Video/audio

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16

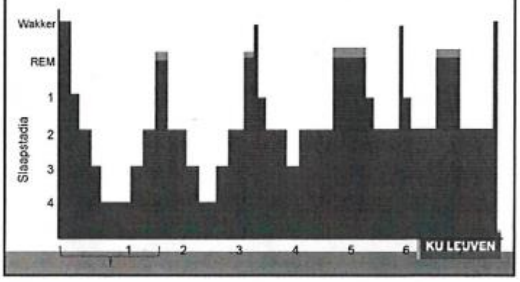
The architecture of sleep



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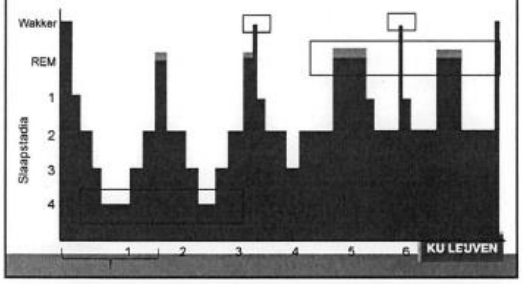
1.1 Sleeparchitecture



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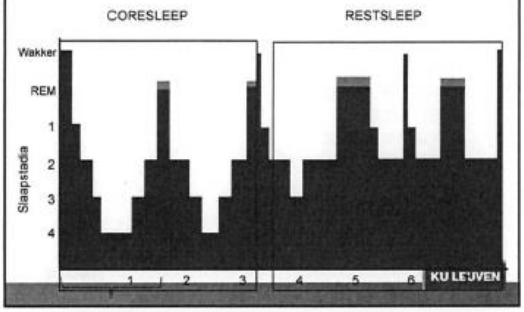
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Sleeparchitecture



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The architecture of sleep



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The architecture of sleep

- ≠ person to person
  - sleep need
    - 4-8-10
- ≠ night to night
- ≠ age



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Overview

- The importance of sleep
- The architecture of sleep
- The do's and don'ts about sleep

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No magic bullets

Creating better conditions for sleep

&

Letting your brain and body do the rest

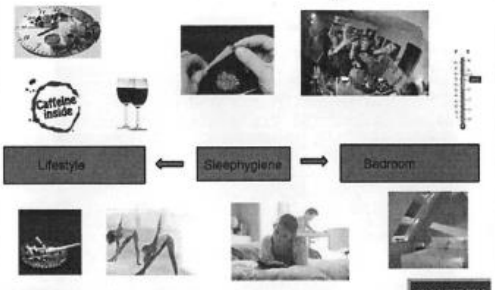
&

And try not to obsess over sleep

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Sleephygiene



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Cafeine



- Activates CNS
- A sleep blocker
- 6 hours half life
  - Avoid after noon!
- Negative impact on sleepquality an quantity
- Genetic predisposition in tolerance

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Alcohol

- Suppresses CNS
  - relaxing en sleepinducing
- But...
  - Sleepquality
  - Sleepcontinuation



! dehydrating
! chronic alcohol abuse

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Smoking

- Activates CNS
  - Don't smoke before bedtime!
  - Watch out for the combined effects of cafeine and nicotine
  - Marihuana impacts REM sleep





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Food

- Eat on fixed moments
- No sleep with empty or full stomach
- Don't drink too much in the evening
- Never eat during the night



zeitgebers

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Bedroom



- Quiet
  - earplugs
- Dark
  - Eyemask
- Mattress
- Alarm clock
- Ventilation, temperature (16-20°C)





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Screens



Computer, laptop, tablet
Smartphone
Videogames, social media

Blue light is very sleep-disruptive!

- Elicits brain activity
- Inhibits melatonine with 20 %

TV, music player, books...

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Sleep, Sex or Sick









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Move it…

- Practice sports, exercise!
  - Lowers physical and emotional stress
  - Improves sleep quality
  - Combats fatigue



- Watch the timing!



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A nap: good or bad?



Couterproductive

When >30min

- May have negative impact on sleep-wake rhythm
- Less core sleep

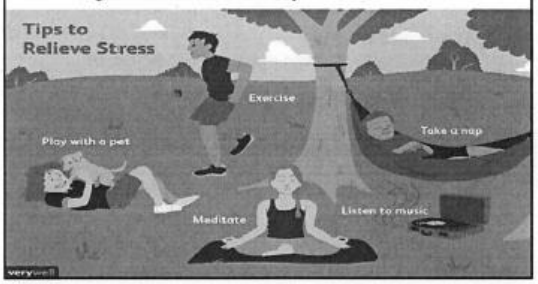
- As early in the day as possible

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Relaxing and winding down

- Night is the mirror of the day



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What when your sleep becomes problematic?

Is it really insomnia or have you just not prepared to sleep properly?

- Stop fighting it
- Do something relaxing in another room
- Fix a cup of (sleepinducing) tea and read something boring until you feel sleepy again
- Do something relaxing, enjoyable yet serves no function
- Respect your chronotype

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What about specialised treatment? CBT-i?

Cognitive behavioral therapy for chronic insomnia

- Restores the confidence in one's ability to sleep
- Breaks bad sleep habits
- Eliminates sleeprelated anxieties
- Uses sleep restriction to increase sleep pressure

- CBT-i> medication

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Where to go for CBT-i?

- **Sleepclinic UZ Leuven**
  - severe chronic insomnia
  - 6 sessions (total 12 hrs)

https://www.uzleuven.be/nl/insomnia

- **First line CBT-i** (only KU Leuven students)

-mild to moderate chronic insomnia

  - 4 sessions (total 6 hrs))
  - March (mondays 11:30-13:00)
  - Liesbet.vanhoudenhove@kuleuven.be

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Where to go?

- UCLL-general psychologist
  - Leuven: https://intranet.ucll.be/nl/node/15970
  - Diest: https://intranet.ucll.be/nl/node/39177
  - Limburg: https://intranet.ucll.be/nl/node/19761

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THANK YOU FOR YOUR ATTENTION

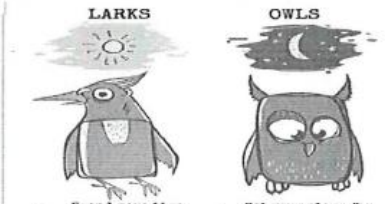


Liesbet.vanhoudenhove@kuleuven.be

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Day-night rhythm



- Spend more time outside in the early afternoon
- Try to exercise later
- Make sure that your bedroom is totally dark
- Set your alarm for the same time every day even on weekends
- Go outside shortly after waking up
- Keep evenings quiet to aid wind down

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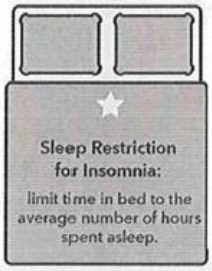
Stimulus Control Training



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Sleep Restriction Therapy



Sleep Restriction Therapy

Technique:

1. Cut time in bed (TIB) to amount of time sleeping.
2. Increase TIB when sleep efficiency is >90% .
3. Decrease TIB when sleep efficiency is <85%
4. Keep hours same with sleep efficiency 85%-90%
5. Adjust schedule weekly until optimum duration of sleep achieved.

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Sleeping aids

- Benzodiazepines
- Non-Benzodiazepines
- Antidepressants
- Melatonine
- Antihistaminics



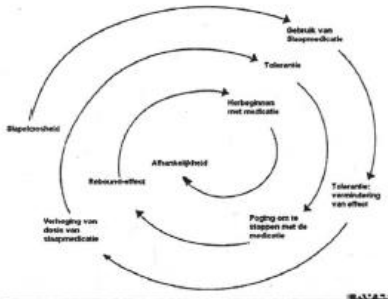
>400 million doses per year in Belgium
<Quick fix society

Insomnia is complex, not curable with a pill

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vicious cycle of use of medication



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	BZD	N-BZD	AD
tolerance	+	+/-	-
dependency	+	+/-	+/-
architecture	+	+/-	-



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THE IMPORTANCE OF SLEEP

WHY	HOW	WHAT IF I
IS SLEEP IMPORTANT?	CAN I SLEEP BETTER?	DON'T GET ENOUGH SLEEP
• Repair your body • Improve learning and memory • Lower stress levels • Improve creativity • Support growth and development • Maintain your immune system	• Go to bed and wake up at the same time each day • Avoid big meals right before bed • Exercise regularly • Turn off the computer, phone, and television • Keep your bedroom cool, quiet, and dark	• It can cause increase anxiety, depression, or other mental health problems • Cause irritability or mood swings • cause headaches, weight gain and poor vision

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SLEEP TIPS AND ADVICE FOR STUDENTS

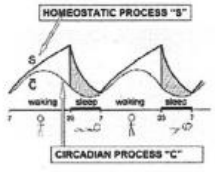


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1.3 Sleepmechanisms

Two-process model of sleep regulation



(Borbély, Human Neurobiol, 1982
(Daan et al Am J Physiol, 1984

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2.3.1 Definition

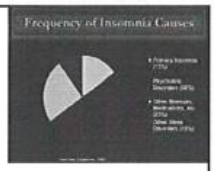


- Subjective complaint of bad sleep
  - Sleep onset
  - Sleep maintenance
  - Early morning awakening
  - Sleep quality
- Minimum 3 x per week; >3 month
- Daytime dysfunction!

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2.3.2 Prevalence?



- General population
  - 10% (5%-15%) chronic insomnia
  - 30% bad nights
- Increases with age
- ♀ > ♂
- 40-50% combined with anxiety or depression
- Most frequent health complaint next to pain

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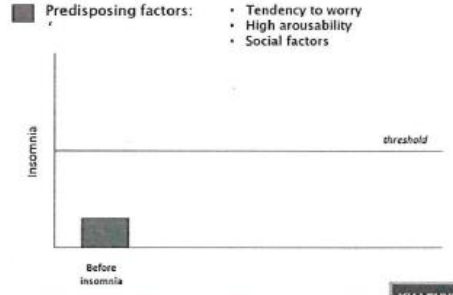
'Psychofysiological insomnia'

- Stressrelated
- Sleeprelated fear
- Unhelpful coping habits
- Conditioned arousal
- Vicious circle

'Learned insomnia'

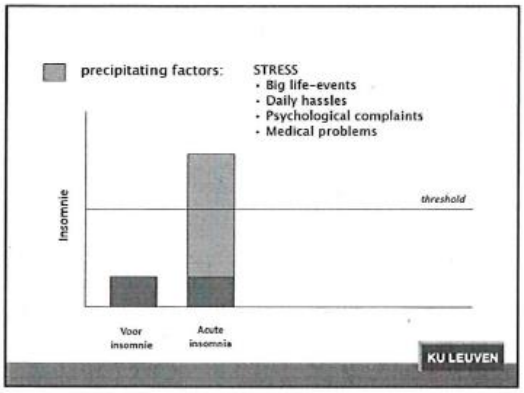
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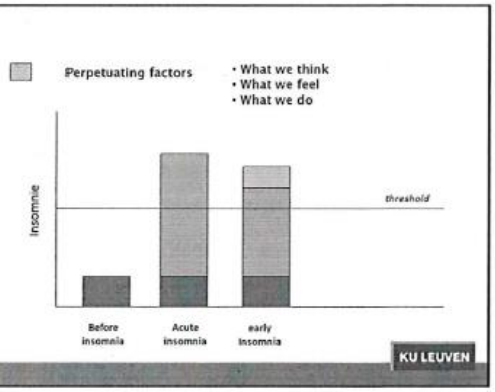
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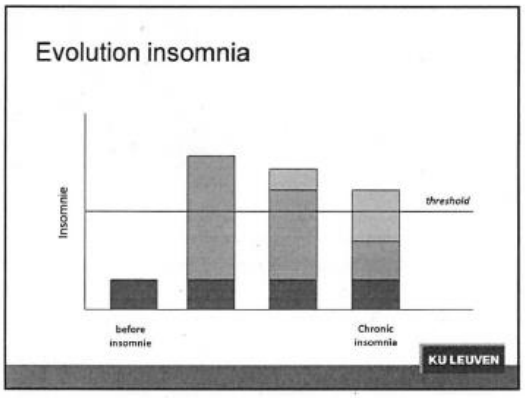
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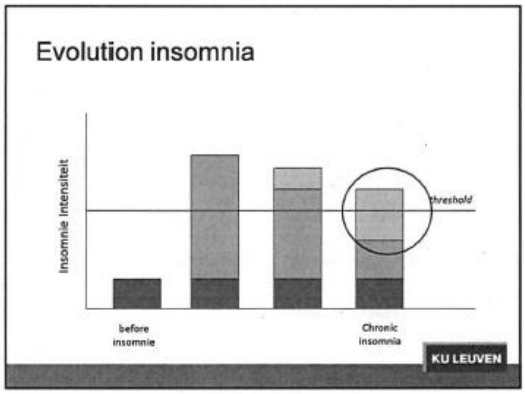


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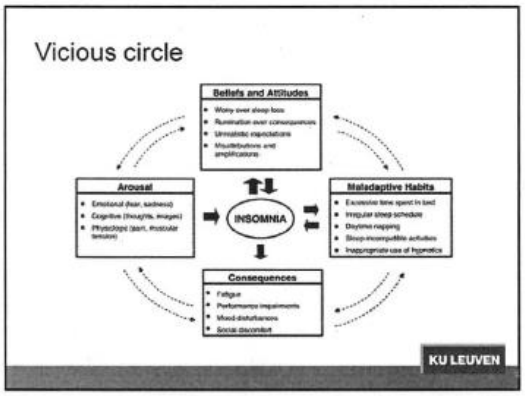
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Evolution insomnia
Insomnie
threshold
before insomnie
Chronic insomnia
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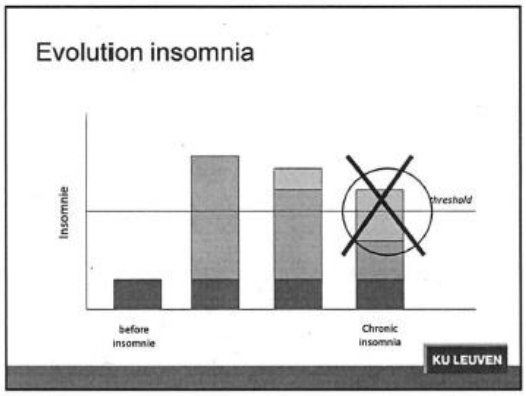
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Evolution insomnia
Insomnia intensiteit
threshold
before insomnie
Chronic insomnia
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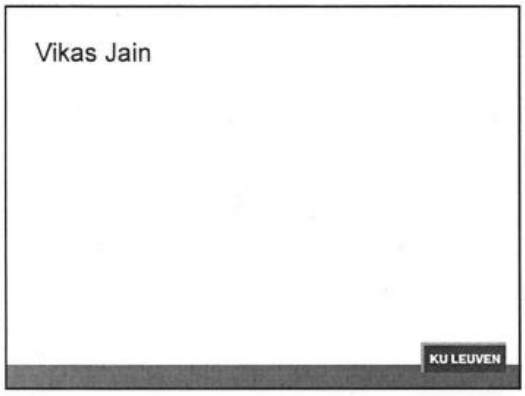
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Vicious circle
Beliefs and Attitudes
Arousal
INSOMNIA
Maladaptive Habits
Consequences
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Evolution insomnia
Insomnie
threshold
before insomnie
Chronic insomnia
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Vikas Jain
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Interview Guide – Dutch

Kenmerken participant

1. Geslacht, leeftijd, studierichting

De reden van deelname aan de educatieve sessie

1. Wat zette je ertoe aan om de sessie over slaap te volgen?
    - Nam je zelf het initiatief of heeft iemand het je aangeraden, zo ja wie?

Kennis omtrent slaap

1. Wat heb je bijgeleerd over het belang van slaap?

Eigen ervaring slaap

1. Vooraleer je de sessies volgde, hoe was jouw slaaphygiëne?
2. Ervaarde je zelf ooit problemen met slaap? Wat hielden deze problemen in? *(bijvoorbeeld problemen met inslapen, problemen met doorslapen, piekergedachten,…)? Wat denk je dat aan de oorzaak lag van je slaapprobleem?*
3. Ondervind/ondervond je overdag hinder door slecht slapen? Hoe uit/uitte zich dit?
4. Wat heb je zelf al geprobeerd om beter te slapen? *Heb je bv. ooit al eens hulp gezocht voor jouw slaapproblemen? Bij wie? Gebruikte je weleens slaapmedicatie, alcohol of drugs om beter te slapen? Wat vond je hiervan? Wat denk je hier nu over na het volgen van de sessies? Wat zal je in de toekomst doen?*

Het nut van de sessies over slaap

1. Wat vond je van de informatieve sessie over slaap?
2. Welke tips over slaaphygiëne vond je nuttig? Welke tips vond je minder nuttig? *Welke do's en dont's over slaaphygiëne heb je onthouden uit de sessie?*
3. Is je slaaphygiëne volgens jou veranderd met wat je geleerd hebt uit de sessie? Hoe? *Kan je bv. je slaaphygiëne nu vergelijken met die van vroeger d.m.v. een punt op 10 te geven voor en na de sessie? Denk je dat dit op de langere termijn zo zal blijven?*
4. Ben je je meer bewust geworden dat slaaptekort een impact kan hebben op de gezondheid door deze sessie?
5. Denk je dat je buiten deze sessie nog extra hulp nodig hebt voor je slaapprobleem *(indien een slaapprobleem een reden was voor deelname was)*? *Wat voor soort hulp?*
6. Zou je de sessie aanraden aan mensen?

Vragen

1. Heb je nog vragen voor ons? Is er iets dat je nog wilt weten over slaap dat niet aan bod gekomen is tijdens de infosessie?

Schematic Representation of Results

Themes	Subthemes	Concepts	Examples of the participants' words
Reasons to participate	Opportunistic		- "I thought it wouldn't be harmful to learn a bit more about it, and that's why I participated with that idea in mind." - "I thought: maybe I can go and listen." - "I'm going to see if it can teach me something." - "I just think it's good to gather as much information about sleep as possible."
	A sleep problem	- Sleeping continuously through the night - Difficulty falling asleep - Difficulty getting up - Long sleeping - Light sleeping	- "Some nights difficulties falling asleep or getting out of bed, that kind of thing. I feel tired and get a slump in the afternoon." - "Because I've actually needed a lot of sleep my whole life, and I thought: maybe I was doing something wrong or something." - "I've always had trouble falling asleep." - "Yeah, uhm, I've often had trouble falling asleep, especially during times with a lot of deadlines or exams." - "It sometimes took me two hours to fall asleep, which was really frustrating."
The participants' thoughts regarding their sleep problems	A clear reason for the sleep problem	- Night work - Heating - Noise - Depression - Stress	- "Yes, I experience problems from time to time, especially last year when I was working night shifts." - "Now I'm pretty sure it's the heating too. Because a few times I forgot to turn the heating off before I went to sleep and then I woke up earlier." - 'When there is a lot of noise in my student house building, I have a lot of trouble with it and I do not sleep at all the night. So yes, especially that external noise plays a big role, because at home I do not have any trouble.' - "I was almost out of that depression and I thought: now I still need naps every day, I never had that before. So I'm doing something wrong, it can't be that I'm still this tired." - 'When I saw the hours ticking by, I started worrying about it. And sometimes

			I'd think, "What time is it now?" and then, "Shit, it's already half past two and I haven't slept yet." That would give me a sort of adrenaline rush, and because of that I needed even more time to calm down again.' - 'I think I had trouble falling asleep, especially during the exam period. I tried to relax after studying, but when you are stressed, that is less successful. I would go to sleep with stress and then falling asleep was not possible right away because you are still thinking about all sorts of things.'
	Concerns about the sleep problem	- Permanent effects	- "When I worked night shifts, I panicked a few times because I had read online that some people can have permanent effects from it. That's also a big reason why I kind of stopped doing it."
	Consequences of the sleep problems	- Loss of motivation - Missing courses - Having to nap during the day - Feeling tired during the day - Stress to go sleeping - Feeling irritated - Feeling stressed - Mental impact - Loss of concentration	- "Yes, basically the whole day after, except for the evening part, I just have zero motivation, and yes I feel like I'm generally not worth much." - "I have maybe once missed a class because of this, but otherwise it has not really affected my studies." - "I always had to take a nap or I wouldn't get through the day. I really needed those naps." - 'That the next day you feel extra stressed, thinking: "Oh no, I didn't sleep last night, what if I can't sleep again tonight?", and that it becomes a bit of a cycle. And I really experienced that too: that I slept badly night after night and felt even more stressed the following day.' - "I definitely noticed that I was more tired and irritated. Yeah, actually really irritated." - "My concentration was also really poor when I slept so badly, so that first year

				was honestly a nightmare. My parents often said I was really unbearable during the exam period, probably a combination of poor sleep and stress.”
Search for help	Professional help	Before the educational session	- General practitioner - Psychologist	- "I went through a time when I really slept poorly, and then my psychologist referred me to the doctor.” - "I first went to a psychologist because I was having problems with sleeping" - “I also went to the doctor shortly after the exam period because I was losing quite a bit of hair when I showered.” - ‘Yes, actually, in my first year, I really struggled with fatigue during the day. I went to the doctor for this. My doctor did a blood test, but everything came back normal. Other than that, I didn’t seek any further help.’ - “I had already been to the doctor, just a family doctor. He had mainly advised me to work with rituals.”
	Medication	Own initiative	- Dormixx	- “One time, when it was really bad, I went to the pharmacist and just asked, 'Is there some natural product I can take? It was called Dormixx.” - “The doctor prescribed something for me: Lunestil.”
		At the recommendation of the general practitioner	- Sedistress sleep - Lunestil	- “My GP gave me Sedistress Sleep. It's over the counter, but I had to take it every day to be able to sleep.” - ‘And I also have, I've forgotten the name... It's something that's mainly meant to reduce panic, because I'm quite a panicky person. That was also to be able to relax, because I started to worry in the evening. But that was on prescription, I wasn't allowed to take it all the time because that would be addictive.’

What the participants tried to improve their sleep	Before the session	- Putting the phone away before sleeping - Trying to go to bed early - Reading - Using earplugs and brown noise - Doing breathing exercises - Having bedtime rituals - Not drinking coffee too late - Not drinking too much before sleeping	- 'I tried to force myself to put my phone somewhere else a few times before, but I noticed that it did not really have any effect. [pause] Well, I've also had periods where I tried to get into bed around 7 p.m., which is very early, but that did not help much either because I was still awake until at least midnight.' - "I made sure to stop studying at least an hour before bedtime and read a book instead. I still do that now." - "So yes, I definitely use earplugs. I also tried 'brown noise,' which creates background noise that helps me focus, and that was helpful too." - "Rituals, for example, when I drink a cup of milk or read a book, help me disconnect a bit from what I did the day before." - 'I really enjoy drinking coffee, so I made an effort not to drink it after 4 p.m.. Generally, I also tried to avoid drinking too much after 7 p.m. because otherwise, I'd have to use the bathroom at night. I also try not to be on my phone for too long right before bed, but I would watch series right before sleeping.'
	After the session	- Bed for the three S's (sleep, sex, sick) - Temperature regulation - Taking fewer naps during the day - Less screen time on the phone or laptop - Not drinking energy drinks/cola too late - Caffeine in chocolate - Calming down before sleeping	- "I took notes on that and hung them up in my room. I'm also avoiding chocolate now, I didn't know that you shouldn't have it in the last hour before sleeping." - "In the morning, a cold shower, in the evening, a warm shower. You need to keep your hands and feet warm, but your body should cool down at the beginning." - "I still watch YouTube in bed, but a lot less than before." - "I try to put my phone away when it gets dark in my room because of that blue light and how it's not good for falling asleep, if I remember correctly." - "I do think about it now when I drink cola,

			like: Oh, maybe not too late or something." - "I also took away some tips on how I can calm myself down before going to sleep." - "...didn't know there was caffeine in chocolate." - "I often used my bed to watch a series or review study material. I'm trying not to do that anymore." - 'This month, not much has changed, but if I experience poor sleep again during a stressful period, I think I would take more breaks during the day to feel less rushed at bedtime. I was already aware of the effects of energy drinks, but if I were to have them while studying again, I would definitely avoid drinking them after noon.'
Thoughts about the educational sessions	Positive points	- Interesting - Informative - Talking to peers	- "Super interesting and helpful as well. I'm glad I ended up going." - "I think that's something every student should know, it definitely doesn't hurt for everyone to attend a session like that once. I believe many people experience something related to sleep hygiene or something similar." - 'But I found the positive aspect was that you could also have conversations with the other people who were there because I still consider it as an important topic. I also think that hearing about other people's routines before sleeping can be quite inspiring.' - "It's not that I felt something was missing. I thought it was a good presentation." - "I found it useful to attend because the more you know and read about it, and you know that it's professional." - 'Yes, especially that it's actually normal to lie awake for about 30 minutes before falling asleep. Uhm... I also found it

			interesting to learn about the different stages of sleep, like REM sleep and NREM sleep, as well as the difference between deep and light sleep.' - "Yes, I think it can be helpful for people with sleep problems who may not know much about it. I also believe not everyone is familiar with sleep hygiene tips, so it's definitely useful."
	Negative points	- Extensive prior knowledge - Concrete tips and tricks to apply - Topics on which they want to receive more information - Scaring	- "What about sleeping with your partner? How does that influence things? Positively or negatively, I would like to know that." - "Actually, I already knew most of the things that were discussed. I think that if you're really focused on your sleep, you're already familiar with everything that was mentioned." - 'Uhm, I had maybe expected more something like… okay, they had said that it was normal that I need more sleep than someone else, but why that is exactly, or whether you can change that yourself, they kind of just skipped over that. I mainly thought: why is that normal?' - "Maybe not very useful in my situation. I understand that those tips can help if you sleep poorly. I was already somewhat aware of most of the tips, but they might not really apply to me." - 'It did surprise me a bit that they discussed that in the session, mentioning the consequences. I thought: "Oh, if people really have very serious sleep problems and attend the session, it might actually cause extra stress, like: oh no, all these consequences might happen to me now." Yes, I maybe found it a bit frightening, but I do understand that they want to show the consequences.'

			- ‘Now although, if I didn’t know anything about it, I think that would scare me. Like, if you sleep badly and then they start talking about health effects like higher risk of cancer, higher risk of strokes, I think that must be quite a shock for some people.’ - "They did give some sleep hygiene tips, but I had expected a bit more from the tips, like, more concrete tips or something. But maybe that’s not realistic, because of course there’s no ready-made solution, I know that too."