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Complete List of Authors:	Abdul Rashid, Aneesa; Universiti Putra Malaysia Fakulti Perubatan dan Sains Kesihatan, Family Medicine; Islamic Medical Association Malaysia Devaraj, Navin Kumar; Universiti Putra Malaysia Fakulti Perubatan dan Sains Kesihatan, Family Medicine; Malaysian Agricultural Research and Development Institute Mustapha, Fauzan; Universiti Putra Malaysia Fakulti Perubatan dan Sains Kesihatan, Family Medicine Wong, Saw Voon; Universiti Putra Malaysia Faculty of Engineering, Mechanical and Manufacturing Engineering Ismail, Ahmad Filza; Universiti Sains Malaysia - Kampus Kesihatan Ismail, Khairil Idham; Ministry of Health Malaysia; Islamic Medical Association of Malaysia Qureshi, Ahmad; Al-Shifa School of Public Health Nordin, Rusli; Taylor's University, School of Medicine; Islamic Medical Association of Malaysia
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Prevalence and Predictors of Commuting Accidents among Medical Doctors in Malaysia: A Study Protocol

Aneesa Abdul Rashid [1,7], Navin Kumar Devraj[1,8], Fauzan Mustapha[1] , Shaw Voon Wong[2], Ahmad Filza Ismail [3], Khairil Idham Ismail [4,7], Ahmad Munir Qureshi[5], Rusli Nordin [6,7]

[1] Department of Family Medicine, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia Serdang, 43400 UPM Serdang, Malaysia

[2] Department of Mechanical and Manufacturing Engineering, Universiti Putra Malaysia, 43400 UPM Serdang, Malaysia

[3] Department of Community Medicine, School of Medical Sciences, USM Universiti Sains Malaysia, 16150 Kubang Kerian, Malaysia

[4] Ministry of Health Malaysia, Block E1, E3, E6, E7 & E10, Complex E, Federal Government Administrative Centre, 62590 Putrajaya, Malaysia Ministry of Health, Malaysia

[5] Visiting Faculty, Al-Shifa School of Public Health, Jhelum Road, Rawalpindi, Pakistan

[6] Head, School of Medicine. Faculty of Health and Medical Sciences. Taylor's University, Lakeside Campus, 1, Jalan Taylor's. 47500 Subang Jaya, Malaysia

[7] Islamic Medical Association of Malaysia, B-G-39 Sri Penara Apartment, Jalan Sri Permaisuri 1, Bandar Sri Permaisuri, 56000 Cheras, Kuala Lumpur

[8] Malaysian Research Institute on Ageing (MyAgeing), Universiti Putra Malaysia, Serdang, 43400, Malaysia

*Corresponding Author:

Dr Aneesa Abdul Rashid

Family Medicine Department, Faculty of Medicine and Health Sciences, University Putra Malaysia, Serdang, Malaysia

Email: aneesa@upm.edu.my

Tel: +603-86092956

Fax: +60389472538

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ABSTRACT

Introduction: Medical doctors are often subjected to long work hours with minimal rest in between the shifts. This has led to many fatal and non-fatal road traffic accidents involving them. This study aims to determine the prevalence and predictors of road crash among medical doctors in Malaysia.

Methods and analysis: This is a cross sectional study among Malaysian medical doctors. It will comprise of 375 doctors who meet the inclusion criteria. A predetermined self-administered questionnaire will be used to measure the socio-demographics, health status, workplace information, work commuting information, driving behaviour, involvement in road traffic accident, fatigue, sleep quality, mental health status and work engagement. The study tool will be questionnaires based on respondents' background (e.g. socio-demographic, health status, workplace information, work commuting information, driving behaviour, involvement in road traffic accident); Checklist Individual Strength Questionnaire (CISQ), Pittsburgh Sleep Quality Index (PSQI), 21-item Depression Anxiety and Stress Score (DASS 21), and The Utrecht's Work Engagement Scale (UWES) questionnaires, respectively. The data will be analysed using SPSS program (Statistical Package for Social Sciences) version 24.

Ethics and dissemination: This study protocol will obtain ethics approval from the Medical Research and Ethics Committee (MREC), Ministry of Health Malaysia and the Ethics Committee for Research Involving Human Subject (JKEP) University Putra Malaysia (UPM). Online informed consent will be obtained from each study participant. The results of study will be disseminated through relevant journals and conferences.

Trial registration number: Current Controlled Trials NCT04243291

https://clinicaltrials.gov/ct2/show/NCT0424329

Strengths & Limitations

1. This nationwide study will examine the prevalence and predictors of road crash among Malaysian medical doctors.
2. The outcome of this study will suggest the ways to address the road crash related factors among medical doctors. The information gathered will assist to develop a comprehensive teaching or training module. This is in line with the government policies of ensuring that our transport and healthcare systems are safe and efficient.
3. The use of non-probability sampling is expected to impose selection bias even though it is economical and logistically advantageous.

INTRODUCTION

Road traffic crashes and injuries is one of the major public health problems globally. The International Labour Organisation (ILO) reports that 2.2 million deaths are reported every year, and 158,000 are due to commuting accidents. A commuting accident is defined as "any accident happening while travelling on a route between a place of residence to a place of work: travelling on a journey made for any reason which is directly connected to employment; or travelling on a journey during any authorized recess". [1,2] In Europe, it was reported that 15% of work-related accidents are commuting accidents. [3] In Malaysia, data on work-related accidents reported by the Social Security Organisation (SOCSO) showed that commuting accidents increased from 31,314 in 2016 to 33,319 accidents in 2017.[4] Commuting accidents contributed to about 47.61% of the total accidents in 2017. This shows an increasing trend since the year 2016. [4] The trend also showed that the accidents are mostly due to travelling to and from work, before morning shift and within 5 kilometres of travel distance, with motorcycle riders having the worse casualties. [5]

The issue of medical doctors and commuting accidents has recently been highlighted in the media and scientific writing, calling for action against the problem. [6–8] It has been reported that the prevalence of road crash is between 13.2% - 25%. [9–12] A 1996 study among 70 junior doctors revealed that 44% had fallen asleep when stopped at a traffic light and 49% had fallen asleep at the wheel. Ninety percent of these events occurred after long working hours (post call), and 20 out of 70 doctors were involved in motor vehicle accidents. [9] Findings from another study among US junior doctors also showed that long working hours, particularly extended shifts, led to more crashes. [12] It's not just long hours but the time during which the doctors perform their duties also play a role; crash involvement is commonly reported after a night shift. [11,13] All the studies mentioned that the link to the crash involvement was sleep deprivation. [9,11,12] Nonetheless, it is worth mentioning that accidents still happen out of long working hours or night shift, which can be up to 15%. [9] Apart from sleep deprivation, working hours and time of work, other road crash related factors have been proposed, such as fatigue.[13] Doctors are known to work long hours,

sometimes extending beyond 24 hours, resulting in sleep deprivation and fatigue.[14–16] Fatigue and sleep deprivation have been studied extensively, especially among healthcare professionals, and have been reported to have a negative impact on their work and wellbeing. [17] This includes reduced clinical judgement, impaired neurocognitive function, and negative effect on the mood. Reduced attention and reaction time has been shown to have profound impact on driving of a motor vehicle.[17] Sleep related disturbance such as obstructive sleep apnoea, micro sleep and poor sleep hygiene are also said to affect the driving performance.[18] After looking into the other contributors of road crash involvement among medical doctors, it is found that the important demographic factors such as gender, distance from work, number of dependent children, health status, exercise, and use of medication were associated with commuting accidents among healthcare and allied health professionals.[19,20] The same studies also relate mental health of the respondents such as work satisfaction and job stress on the driving performance.[19,20] Local data pertaining to this issue is very limited. Ministry of Health Malaysia (MOH) data showed that 554 commuting accidents occurred between the years 2014 to 2016 amongst the healthcare personnel. The distribution by job position revealed that 54% were nurses while the rest were medical doctors (6.3%), the remaining included medical assistants (6.3%), hospital attendants (16.4%), drivers (5.6%), food preparation attendants (2.7%) and others (9.4%). [21] It is obvious that the percentage of doctors involved in crash is not the highest; however, doctor numbers are 3-4 times lower than staff nurses, combined with a possibility of under reporting which may be the reason. Also, as the country has heavily invested in training and employment of doctors, this figure will impact the economy and quality of healthcare delivery. [22] A quick online 24-hour survey among Malaysian medical doctors involved in road accidents revealed that more than 440 of them who were admitted from 2009 to 2015 had met road accidents after long hours of work.[23] However, this survey was carried out by Medical Non-Governmental Organisations (NGO) and has shown limitations in its study design, as it was one of the first quick surveys to explore such issue . This was a response of a few road crash fatalities reported among medical doctors due to long hours

of work. Since then, this issue has been brought up by several other NGOs . Therefore, this may suggest that officially reported numbers is just the tip of iceberg.

In terms of economic burden, if a medical doctor is involved in a bad or fatal accident, the implications are huge. To put this into perspective, the Malaysian Medical Council (MMC) in coordination with Malaysian Qualifications Agency (MQA) has ruled that every medical practitioner needs to complete a minimum of five years of undergraduate programme followed with two years of houseman ship training. The total fee for five years of undergraduate training in Malaysia ranges from RM 10, 000.00 to RM 450,000.00.[24] On top of this, the total emolument for a medical doctor ranges from RM 4,300.00 to RM 23, 000.00 per month depending on the specified salary grades.[22] Thus, losing a medical doctor will cause great financial burden to the economy, country and the families involved.

Due to the aforementioned issue, and the lack of published data, many NGOs have joined together with the help of researchers from local universities to explore and help understand this problem.

Findings of this study will be used to highlight the magnitude of the problem as well as to recommend and assist in development of an appropriate module to help doctors combat fatigue, and address factors related to commuting accidents and road crash involvement.

METHODS AND ANALYSIS

Study design

Cross-sectional online questionnaire study

Study area

Malaysia (nation-wide)

Study duration :

April 2020– May 2021

Study participants

Malaysian Medical Association (MMA) members who are fully or partially registered with the Malaysian Medical Council (MMC) and their contacts. MMA is the main representative body for all registered medical practitioners in Malaysia. MMA members include senior and junior doctors, private and public, specialists and general practitioners, medical officers and house officers.

The eligibility criteria are based on the following:

Inclusion Criteria

1. Malaysian citizen
2. Full or partial registration with MMC
3. Work a minimum of six (6) months in the healthcare sector in Malaysia.

Exclusion Criteria

1. Medical doctors currently on a long leave.
2. Does not self-commute to work
3. Those with psychiatric illness

Sample size

The prevalence of road crash among doctors is 13.9-25%. [9–12] We choose prevalence (P) of 25% for cases of road traffic accidents as it yielded the highest number for sample size. Taking into account 95% confidence level and 5% margin of error. The formula for sample size calculation is as follows:

$$n = z^2_{1-\alpha/2} P(1-P)/d^2$$

Where n is the sample size, π is the prevalence of interest, Z is the standard normal value corresponding to the desired confidence level, and E is the maximum error that is allowed (margin of error). Based on this formula, Z = 1.96 (confidence level of 95%), E = 5% and π = 0.5. Considering 30% non-response or dropout rate, the sample size is increased from 288 to 375.

Selection criteria

Respondents will be selected via non probability random sampling among MMA registered member list and their network. The sample will be doctors who are partially or fully registered with the Malaysian Medical Council and fulfils the inclusion and exclusion criteria. The participants who are eligible will need to answer questionnaire via an online survey link.

Data collection

This study will be in collaboration with the Malaysian Medical Associations(MMA) which will recruit the sample for this research along with other medical NGOs including the Islamic Medical Association of Malaysia (IMAM) which is the lead NGO in this project. MMA will help in dissemination of information through their website as well as will distribute/email the questionnaires to all MMA members and their contacts. Participants will answer the self-administered questionnaire via the online link. The estimated time for participants to complete

this questionnaire is 20-30 minutes. The questionnaire will be administered only once to the subjects and the duration of the study is estimated to be one year. Upon completion of the questionnaire, the participants will have no further commitment to this research. However, subject will be informed if the study data is potentially useful to the subject's well-being.

The questionnaire will be created by using Google Form and then will be saved on Google Drive. Then MMA will share the form to all of its members through email. All responses will be saved in the file stored in Google Drive. Once the sample size is acquired, the form will be closed and results will be downloaded for data analysis. The data collected will be recorded in another separate offline document after being retrieved from Google Form and all data in the Google Form will be destroyed.

Data analysis

Data entry and analysis will be undertaken by using the 'Statistical Package for Social Sciences' (SPSS) programme, Version 24.0. The statistical significance level is taken at the p value of <0.05 with 95% of confidence interval (CI). The continuous variables will be summarised by using means and standard deviation (SD) and predominantly categorised as required and presented as the number (n) and percentage (%). The statistics analysis will utilise the Pearson Chi-square test for obtaining the statistical difference of the categorical variables.

Lastly, logistic regression analysis will be used to describe the strength of association between the outcome and factors of interest, adjusting for covariates or confounders. It also allows one to determine the important factors affecting the outcome and generate the final model for the factors being studied as the predictor for the outcomes.

If there is any incomplete questionnaire, it will be handled as an appropriate data analysis technique.

Study instrument

Questionnaire / Scoring:

A predetermined self-administered questionnaire will be used to measure the socio-demographics, health status, workplace information, work commuting information, driving behaviour, involvement in road traffic accident, fatigue, sleep quality, mental health status and work engagement. All of the questionnaires are free for use as it is public domain and or for non-commercial and academic purpose. The questionnaire is divided into five parts:

- **Part A**: This is pertaining to the attributes of the respondents. Details include the sociodemographic, work information, health and lifestyle, and involvement in road crash and near misses. It is divided into four sections as follows:

- Section A consists of six questions on socio-demographics (i.e. age, ethnicity, gender, marital status, and educational background).

- Section B consists of seven questions on health status (i.e. medical illness, exercise, smoking status)

- Section C consists of twenty questions on workplace information (i.e. length of employment, employer, current position and department, duration of work, work hours, work routine, napping, exposure to chemicals)

- **Section D** consists of six questions on work commuting information (including mode of transportation, distance and time travelled).

- **Section E** is on driving behaviour. This has eleven questions. (measuring driving habits, speed of driving, occurrences of mind wandering, sudden outbursts, distraction, driving circumstances such as under alcohol influence, history of nodding off and falling asleep while driving, losing focus while driving, consuming substance before and while driving, driving for fun).

- **Section F** is involvement in road traffic accidents. This consists of 24 questions (measuring involvement in road traffic accident, near miss accident, explaining the worse encountered accident, injury and its losses)

Part B: (see appendix 2) pertaining to the level of fatigue using the Checklist of Individual Strength Questionnaire (CISQ).[25] in English and Malay Language as obtained from a prior MIROS study. The CISQ is a 20-item questionnaire designed to measure the aspects of fatigue and asking respondents of their feelings during the preceding two weeks. It is self-reported in nature and consists of four components identified via factor analysis for: 1) subjective experience of fatigue (8 items), 2) concentration (5 items), motivation (4 items), and level of physical activity (3 items).

The total scale has a Cronbach's alpha of 0.93, and is scored using the 7-point Likert scale. Higher scores indicate a higher degree of fatigue, more concentration problems, reduced motivation, and less physical activity. A composite CISQ score that ranges from 20 to 140 is constructed by summing up individual scores obtained from all four components to capture the subjective sensation of fatigue and reduced functioning (i.e. concentration, motivation, and activity level). Case classification is obtained by implementing a cut-off CISQ point of >76; those who scored more than 76 are designated as probable fatigue case. This cut-off value was established in a different pilot study using defined samples with differences in the fatigue level. This questionnaire has been validated and has been used for other studies. Therefore, no validation process is required for this questionnaire.

- Part C: (see appendix 3) pertaining to the sleep quality using the Pittsburgh Sleep Quality Index (PSQI). [26] The PSQI assesses the quality and patterns of sleep, differentiating "poor" and "good" sleep using a measurement of seven items: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction over the last month. Scoring of answers is based on a 0-to-3 scale, whereby 3 reflects the negative extreme on the Likert Scale. The score for each component will then be summed up as Global PSQI score. A Global PSQI score of "5" or greater indicates a "poor sleeper".

- **Part D**: (see appendix 4) has 2 versions . The original version has 41 questions, and the shorter version is the Depression Anxiety and Stress Score (DASS 21). The scores will categorise individuals to be low, moderate or severe in each domain. Both questionnaires have a Cronbach's alpha score of 0.96 to 0.97 for DASS-Depression, 0.84 to 0.92 for DASS-Anxiety, and 0.90 to 0.95 for DASS Stress. Studies have found this tool to be a good tool to assess general and clinic based population. For this study the DASS 21 will be used as it is shorter, and more convenient .[27,28]
- **Part E**: (see appendix 5) The Utrecht's Work Engagement Scale (UWES) questionnaire to assess positive psychological well-being of employees while at work. [29] It consists of 17 items, categorised under the dimensions of vigour, dedication and absorption. Each item is scored on a 7-point scale ranging from 0 (never) to 6 (everyday). Cronbach's alpha score for vigour ranged between 0.75 to 0.85, 0.86 to 0.90 for dedication and 0.82 to 0.88 for absorption. Higher scores indicate higher identification of workers with their job and lower burnout rates.

Validation of questionnaires

Validation will be conducted using a pre-determined questionnaire incorporating socio-demographic data, Pittsburgh Sleep Quality Index (PQSI), Checklist of Individual Strength Questionnaire (CISQ), DASS (Depression, Anxiety and Stress)-21 and Utrecht's Work Engagement Scale (UWES) among the study population which are Malaysian medical doctors. It will be done to ensure the validity (face and content) and reliability (internal consistency) of this questionnaire for this study.

Ethical considerations

This study's approval for ethical clearance will be obtained from the Medical Research and Ethics Committee (MREC), Ministry of Health Malaysia and the Ethics Committee for Research Involving Human Subjects (JKEP), University Putra Malaysia (UPM). Informed consent will be obtained

from each study participant and it will be stated at the beginning of the questionnaire. They will not be required to sign in to an account in order to fill in the survey. They will also be told the right not to respond to the questions if they don't want to. All data to be kept confidentially for research purposes only and won't be disclosed to any third parties. As to publication, all personal information will be kept confidential so that the identity of the participants will not be made public. Google Form responses are stored in a worksheet that can only be accessed through a Google login, only two of the researchers have access to this. The account is password protected. Then, the data collected will be recorded in another separate offline document after being retrieved from Google Form and all data in the Google Form will be destroyed. The responses data will only be accessed by two researchers only. The data will also be stored for at least seven years from the date of final publication. It will then be achieved when there is no need to re-evaluate the data.

Dissemination

Results of this study will be disseminated by publication through peer-reviewed professional and scientific journals. The participants' data will be kept confidential and will not be shared with the public. If there are requests for data sharing for appropriate research purposes, this will be considered on an individual basis after the trial completion and after the publication of the primary manuscripts.

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Conflict of interests: none.

Contributors Study design: AAR, NKD, RN, AFI, AMQ, KII, SVW, FM, WAB. Manuscript preparation: AAR, NKD, FM, RN.

Data sharing statement Researchers wishing to use the data obtained from this study should contact Aneesa Abdul Rashid (aneesa@upm.edu.my), the Principal Investigator.

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Questionnaire

(Appendix1)

1. Socio-demography

MC Number	
Age (years): Date of Birth (DD/MM/YY):	
Gender: circle (M/F):	
Ethnicity: circle (Malay / Chinese / Indian / Others):	
Marital status: circle (Married/Single/Separated/Divorced/Widower)	
Highest educational background (please state if others) (Basic medical degree / post-graduate diploma / master of medicine / PhD / Other)	

2. Health status

Do you suffer from any medical illness?	Y/N
If yes, specify:	• Diabetes Mellitus • Hypertension • Ischemic Heart Disease • Stroke • Epilepsy • Mental Health • Others:
Do you perform regular exercise?	Y/N

If yes, specify frequency:	• 1-2 days per week • 3-4 days per week • 5-6 days per week • Every day
Specify total no of hours per week:	
Do you smoke?	Y/N
If yes, please specify number of cigarette sticks per day:	

3. Work information

Length of employment (years), if not applicable, please put "-"	
Length of employment (months), if not applicable, please put "-"	
Employer type	• Public institution • Private institution • Self-employed
Current department (Specify)	
Position: (Houseman /Medical Officer /Post-graduate Trainee / Specialist /Consultant)	
Duration of current work experiences (years), if not applicable, please put "-"	
Duration of current work experiences (months), if not not applicable, please put "-"	
Average work hours per week: (hours)	
Work routine: • Office hours • Shift work • On-call system • Flexi hours • Others	

If on-call system:(please describe general system; such as. average on-call frequency, do you work the day after post-call? if yes how many hours)	
If shift/ flexi hour system: (Please describe general system; such as duration for each shift)	
If others:(please state general system; such as. duration of every working period)	
State your total official working hours (in hours) 1 week ago (such as 56 hours).	
State your total official working hours (in hours) 2 weeks ago (such as 40 hours).	
Do you do overtime?	Y/N
If you do overtime, how many hours per day?	
If you do overtime, how many days per week?	
Do you practice napping during work?	Y/N
If yes, estimate how many hours per day? (hours/day)	
Do you get exposure to chemical/gases/solvents at workplace?	Y/N

4. Work commuting information

Mode of transportation to commute to work (you may pick more than one) • Motorbike/ scooter • Car • Other	
How far is your work place from your home? Please estimate the distance in kilometers (km).	
State total time in minutes per day commuting TO work (in minutes)	
Commuting start time TO work	
State total time in minutes per day commuting FROM work TO home (in minutes)	
Commuting start time FROM work	

5. Driving behaviour

Type of driver • Careful • Follow traffic regulations	(Never) 1 2 3 4 5 (Always)
Do you practice the following habits? : • Give signal when overtaking, changing lane, or turning. • Keep safe distance from the vehicle in front. • Drive more carefully when raining. • Wear seatbelt when in vehicle. • Wear helmet when riding motorbike. • Strictly follow vehicle's manufacturer maintenance schedule • Follow speed limit	(Never) 1 2 3 4 5 (Always)
Driving speed	(Never) 1 2 3 4 5 (Always)
Have you experienced the following driving? • Mind-wandering state • Sudden outburst of anger • Distraction	(Never) 1 2 3 4 5 (Always)
Have you driven under the following circumstances? • While using hand-held device • When tired • In a bad mood • Under mental distress/duress • Under alcohol or recreational drug influence	(Never) 1 2 3 4 5 (Always)
Within the LAST 2 WEEKS, have you ever done any of the following while commuting to and from work? • Nodded off while driving • Nodded off while stopping	(Never) 1 2 3 4 5 (Always)
Within the LAST 2 WEEKS, have you ever done any of the following while commuting to and from work? • Fall asleep while driving • Fall asleep while stopping (such as at traffic lights)	(Never) 1 2 3 4 5 (Always)
Within the LAST 2 WEEKS, have you ever done any of the following while commuting to and from work? • Lost focus while driving • Lost focus while stopping (such as. at traffic lights)	(Never) 1 2 3 4 5 (Always)
Do you consume any of the following substances BEFORE driving? • Caffeinated drinks (tea, coffee, colas) • Prescription medication • Traditional supplements • Alcohol	(Never) 1 2 3 4 5 (Always)
Do you consume any of the following substances	

DURING driving? • Caffeinated drinks(tea,coffee,colas) • Prescription medication • Traditional supplements • Alcohol	(Never) 1 2 3 4 5 (Always)
Do you drive for fun?	(Never) 1 2 3 4 5 (Always)

6. Involvement in road traffic accident

Since you started driving, have you ever been involved in road traffic accident?	Y/N
If yes, please choose number of time	• Once • Twice • Thrice • Several
For the past 2 weeks, have you NEARLY BEEN INVOLVED in a road accident due to: • Tiredness • Nodding off • Sleepiness	(Never) 1 2 3 4 5 (Always)
If yes, please state the number of times	
For the past 2 weeks, have you BEEN INVOLVED in a road accident due to: • Tiredness • Nodding off • Sleepiness	(Never) 1 2 3 4 5 (Always)
If yes, please state the number of times	
Please describe below the worst accident you have encountered during work commute	
Did this happened the last 2 weeks?	Y/N
If no please state when.	
Intensity of accident encountered	(Mild) 1 2 3 4 5 (Severe)
Number of vehicle involved	• One • Two • More than two
Estimated cost of vehicle repairs (RM)	

Anyone sustained injury during accident?	Y/N

If yes, please specify who	• Yourself • Others • Both
Severity of injury	(Mild) 1 2 3 4 5 (Severe)
Disability after accident	Y/N
If yes, please specify	• Temporary • Permanent
Total cost of treatment (RM)	
Medical leave required post-injury?	Y/N
If yes, specify no of days	
Injury been compensated by insurance	Y/N
Any fatality during accident	Y/N
Do you practice other activities while driving to keep you alert to avoid sleepiness/microsleep?	Y/N
If yes, please specify • By entertainment system (radio/CD player/TV, etc) • Talking with fellow car occupant • Looking at surrounding	

(Appendix 2) Page 1 of 4

Subject's Initials_____ ID#_____ Date_____ Time___ AM PM

PITTSBURGH SLEEP QUALITY INDEX

INSTRUCTIONS:
The following questions relate to your usual sleep habits during the past month only. Your answers should indicate the most accurate reply for the majority of days and nights in the past month. Please answer all questions.

1. During the past month, what time have you usually gone to bed at night?

BED TIME _____

2. During the past month, how long (in minutes) has it usually taken you to fall asleep each night? NUMBER OF MINUTES _____

3. During the past month, what time have you usually gotten up in the morning?

GETTING UP TIME _____

4. During the past month, how many hours of actual sleep did you get at night? (This may be different than the number of hours you spent in bed.)

HOURS OF SLEEP PER NIGHT_____

For each of the remaining questions, check the one best response. Please answer all questions.

5. During the past month, how often have you had trouble sleeping because you . . .

a) Cannot get to sleep within 30 minutes

Not during the month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

b) Wake up in the middle of the night or early morning

Not during the month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week

c) Have to get up to use bathroom

Not during the month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

d) Cannot breathe comfortably

Not during the month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

e) Cough or snore loudly

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

f) Feel too cold

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

g) Feel too hot

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

h) Had bad dreams

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

i) Have pain

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

j) Other reason(s), please describe_____

_____

How often during the past month have you had trouble sleeping because of this?

Not during the month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

6. During the past month, how would you rate your sleep quality overall?

Very good_____

Fairly good_____

Fairly bad_____

Very bad_____

7. During the past month, how often have you taken medicine to help you sleep (prescribed or "over the counter")?

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

8. During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

9. During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?

No problem at all _____

Only a very slight problem _____

Somewhat of a problem _____

A very big problem _____

10. Do you have a bed partner or room mate?

No bed partner or room mate _____

Partner/room mate in other room _____

Partner in same room, but not same bed _____

Partner in same bed _____

If you have a room mate or bed partner, ask him/her how often in the past month you have had . . .

a) Loud snoring

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

b) Long pauses between breaths while asleep

Not during the past month_____ Less than once a week_____ Once or twice a week_____ Three or more times a week_____

c) Leg twitching or jerking while you sleep

Not during the past month_____	Less than once a week_____	Once or twice a week_____	Three or more times a week_____

d) Episodes of disorientation or confusion during sleep

Not during the past month_____	Less than once a week_____	Once or twice a week_____	Three or more times a week_____

e) Other restlessness while you sleep; please describe_____

_____

Not during the past month_____	Less than once a week_____	Once or twice a week_____	Three or more times a week_____

Buysse DJ, Reynolds CF, Monk TH, Berman SR, Kupfer DJ: Psychiatry Research, 28:193-213, 1989.

(Appendix 3)

CHECKLIST INDIVIDUAL STRENGTH QUESTIONNAIRE -FATIGUE

******** CIS20R ********
Checklist Individual Strength
University Hospital Nijmegen
Department of Medical Psychology

Instruction:
On the next page you find 20 statements. With these statements we wish to get an impression of how you have felt during the past two weeks. For example:

I feel relaxed

If you feel that this statement is not true at all, place a cross in the right box; like this:

I feel relaxed	**yes**, that is true	X						**no**, that is not true

If you feel that this statement is not true at all, place a cross in the right box; like this:

I feel relaxed	**yes**, that is true						X	**no**, that is not true

If you feel that this statement in not "yes, that is true", but also not "no, that is not true", place a cross in the box that is most in accordance with how you have felt.
For example, if you feel relaxed, but not very relaxed, place a cross in one of the boxes close to "yes, that is true": like this:

I feel relaxed	**yes**, that is true			X				**no**, that is not true

Do not skip any statement and place only one cross for each statement.

1. I feel tired	yes, that is true							no, that is not true
2. I feel very active	yes, that is true							no, that is not true
3. Thinking requires effort	yes, that is true							no, that is not true
4. Physically I feel exhausted	yes, that is true							no, that is not true
5. I feel like doing all kinds of nice things	yes, that is true							no, that is not true
6. I feel fit	yes, that is true							no, that is not true
7. I do quite a lot within a day	yes, that is true							no, that is not true
8. When I am doing something, I can concentrate quite well	yes, that is true							no, that is not true
9. I feel weak	yes, that is true							no, that is not true
10. I don't do much during the day	yes, that is true							no, that is not true
11. I can concentrate well	yes, that is true							no, that is not true
12. I feel rested	yes, that is true							no, that is not true
13. I have trouble concentrating	yes, that is true							no, that is not true
14. Physically I feel I am in a bad condition	yes, that is true							no, that is not true
15. I am full of plans	yes, that is true							no, that is not true
16. I get tired very quickly	yes, that is true							no, that is not true
17. I have a low output	yes, that is true							no, that is not true
18. I feel no desire to do anything	yes, that is true							no, that is not true
19. My thoughts easily wander	yes, that is true							no, that is not true
20. Physically I feel in a good shape	yes, that is true							no, that is not true

SCORING CIS20R
For the items: **2, 5, 6, 7, 8, 11, 12, 15, 20** is the scoring as follows:

	yes, that is true	1	2	3	4	5	6	7	**no**, that is not true

For the items: **1, 3, 4, 9, 10, 13, 14, 16, 17, 18, 19** is the scoring as follows:

	yes, that is true	7	6	5	4	3	2	1	**no**, that is not true

Subsequently **the four subscales** are calculated by summing the respective items

subscale 1: Subjective feeling of fatigue	items 1, 4, 6, 9, 12, 14, 16, 20
subscale 2: Concentration	items 3, 8, 11, 13, 19
subscale 3: Motivation	items 2, 5, 15, 18
subscale 4: Physical activity	items 7, 10, 17

(Appendix 4)

DASS21

Name: *Date:*

Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you *over the past week*. There are no right or wrong answers. Do not spend too much time on any statement.

The rating scale is as follows:

0 Did not apply to me at all
1 Applied to me to some degree, or some of the time
2 Applied to me to a considerable degree, or a good part of time
3 Applied to me very much, or most of the time

1	I found it hard to wind down	0	1	2	3
2	I was aware of dryness of my mouth	0	1	2	3
3	I couldn't seem to experience any positive feeling at all	0	1	2	3
4	I experienced breathing difficulty (eg, excessively rapid breathing, breathlessness in the absence of physical exertion)	0	1	2	3
5	I found it difficult to work up the initiative to do things	0	1	2	3
6	I tended to over-react to situations	0	1	2	3
7	I experienced trembling (eg, in the hands)	0	1	2	3
8	I felt that I was using a lot of nervous energy	0	1	2	3
9	I was worried about situations in which I might panic and make a fool of myself	0	1	2	3
10	I felt that I had nothing to look forward to	0	1	2	3
11	I found myself getting agitated	0	1	2	3
12	I found it difficult to relax	0	1	2	3
13	I felt down-hearted and blue	0	1	2	3
14	I was intolerant of anything that kept me from getting on with what I was doing	0	1	2	3
15	I felt I was close to panic	0	1	2	3
16	I was unable to become enthusiastic about anything	0	1	2	3
17	I felt I wasn't worth much as a person	0	1	2	3
18	I felt that I was rather touchy	0	1	2	3
19	I was aware of the action of my heart in the absence of physical exertion (eg, sense of heart rate increase, heart missing a beat)	0	1	2	3
20	I felt scared without any good reason	0	1	2	3
21	I felt that life was meaningless	0	1	2	3

DASS-21 Scoring Instructions

The DASS-21 should not be used to replace a face to face clinical interview. If you are experiencing significant emotional difficulties you should contact your GP for a referral to a qualified professional.

Depression, Anxiety and Stress Scale - 21 Items (DASS-21)

The Depression, Anxiety and Stress Scale - 21 Items (DASS-21) is a set of three self-report scales designed to measure the emotional states of depression, anxiety and stress.

Each of the three DASS-21 scales contains 7 items, divided into subscales with similar content. The depression scale assesses dysphoria, hopelessness, devaluation of life, self-deprecation, lack of interest / involvement, anhedonia and inertia. The anxiety scale assesses autonomic arousal, skeletal muscle effects, situational anxiety, and subjective experience of anxious affect. The stress scale is sensitive to levels of chronic non-specific arousal. It assesses difficulty relaxing, nervous arousal, and being easily upset / agitated, irritable / over-reactive and impatient. Scores for depression, anxiety and stress are calculated by summing the scores for the relevant items.

The DASS-21 is based on a dimensional rather than a categorical conception of psychological disorder. The assumption on which the DASS-21 development was based (and which was confirmed by the research data) is that the differences between the depression, anxiety and the stress experienced by normal subjects and clinical populations are essentially differences of degree. The DASS-21 therefore has no direct implications for the allocation of patients to discrete diagnostic categories postulated in classificatory systems such as the DSM and ICD.

Recommended cut-off scores for conventional severity labels (normal, moderate, severe) are as follows:

NB Scores on the DASS-21 will need to be multiplied by 2 to calculate the final score.

	Depression	Anxiety	Stress
Normal	0-9	0-7	0-14
Mild	10-13	8-9	15-18
Moderate	14-20	10-14	19-25
Severe	21-27	15-19	26-33
Extremely Severe	28+	20+	34+

Lovibond, S.H. & Lovibond, P.F. (1995). Manual for the Depression Anxiety & Stress Scales. (2nd Ed.) Sydney: Psychology Foundation.

(Appendix 5)

UTRECHT'S WORK ENGAGEMENT SCALE (UWES)

The following 17 statements are about how you feel at work. Please read each statement carefully and decide if you ever feel this way about your job. If you have never had this feeling, cross the "0" (zero) in the space after the statement. If you have had this feeling, indicate how often you feel it by crossing the number (from 1 to 6) that best describes how frequently you feel that way.

Score	Description
0	Never
1	Almost never (A few times a year or less)
2	Rarely (Once a month or less)
3	Sometimes(A few times a month)
4	Often (Once a week)
5	Very often (A few times a week)
6	Always (Everyday)

No	Statement	Score
F1	At my work, I feel bursting with energy	
F2	I find the work that I do full of meaning and purpose	
F3	Time flies when I'm working	
F4	At my job, I feel strong and vigorous	
F5	I am enthusiastic about my job	
F6	When I am working, I forget everything else around me	
F7	My job inspires me	
F8	When I get up in the morning, I feel like going to work	
F9	I feel happy when I am working intensely	
F10	I am proud of the work that I do	
F11	I am immersed in my work	
F12	I can continue working for very long periods at a time	
F13	To me, my job is challenging	
F14	I get carried away when I'm working	
F15	At my job, I am very resilient, mentally	
F16	It is difficult to detach myself from my job	
F17	At my work I always persevere, even when things do not go well	

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Prevalence and Predictors of Road Crash Involvement Among Medical Doctors in Malaysia: A Cross – Sectional Study Protocol

Aneesa Abdul Rashid [1,7], Navin Kumar Devaraj[1,8], Halidah Mohd Yusof [1], Fauzan Mustapha[1], Shaw Voon Wong [2], Ahmad Filza Ismail [3], Khairil Idham Ismail [4,7], Ahmad Munir Qureshi[5], Rusli Bin Nordin [6,7]

[1] Department of Family Medicine, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia Serdang, 43400 UPM Serdang, Malaysia

[2] Department of Mechanical and Manufacturing Engineering, Universiti Putra Malaysia, 43400 UPM Serdang, Malaysia

[3] Department of Community Medicine, School of Medical Sciences, USM Universiti Sains Malaysia, 16150 Kubang Kerian, Malaysia

[4] Ministry of Health Malaysia, Block E1, E3, E6, E7 & E10, Complex E, Federal Government Administrative Centre, 62590 Putrajaya, Malaysia Ministry of Health, Malaysia

[5] Visiting Faculty, Al-Shifa School of Public Health, Jhelum Road, Rawalpindi, Pakistan

[6] Head, School of Medicine. Faculty of Health and Medical Sciences. Taylor's University, Lakeside Campus, 1, Jalan Taylor's. 47500 Subang Jaya, Malaysia

[7] Islamic Medical Association of Malaysia, B-G-39 Sri Penara Apartment, Jalan Sri Permaisuri 1, Bandar Sri Permaisuri, 56000 Cheras, Kuala Lumpur

[8] Malaysian Research Institute on Ageing (MyAgeing), Universiti Putra Malaysia, Serdang, 43400, Malaysia

*Corresponding Author:

Dr Aneesa Abdul Rashid

Family Medicine Department, Faculty of Medicine and Health Sciences, University Putra Malaysia, Serdang, Malaysia

Email: aneesa@upm.edu.my

Tel: +603-86092956

Fax: +60389472538

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ABSTRACT

Introduction: Medical doctors are often subjected to long working hours with minimal rest in between the shifts. This has led to many fatal and non-fatal road crash involvement (RCI). This study aims to determine the prevalence and predictors of RCI among medical doctors in Malaysia.

Methods and analysis: This is a cross sectional study among 375 Malaysian medical doctors who met the inclusion criteria. A predetermined self-administered questionnaires will be used to collect information regarding the socio-demographic, health status, workplace information, work commuting information, driving behaviour, history of RCI, fatigue, sleep quality, mental health status and work engagement. The questionnaires consist of the following instruments: (1) Socio-demographic, health status, workplace information, work commuting information, driving behaviour, and history of RCI; (2) Checklist of Individual Strength Questionnaire (CISQ); (3) Pittsburgh Sleep Quality Index (PSQI); (4) 21-item Depression Anxiety and Stress Scale (DASS-21); and (5) Utrecht's Work Engagement Scale (UWES). The data will be analysed using SPSS program (Statistical Package for Social Sciences) version 24. Descriptive and inferential statistics will be used to determine the prevalence and predictors of RCI.

Ethics and dissemination: This study protocol has received ethics approval from the Medical Research and Ethics Committee (MREC), Ministry of Health Malaysia (NMRR-18-3983-40609) and the Ethics Committee for Research Involving Human Subject, University Putra Malaysia (JKEUPM). Online written informed consent will be obtained from each study participant by the researchers. Results of the study will be disseminated through relevant journals and conferences.

Trial registration number: Current Controlled Trials NCT04243291

https://clinicaltrials.gov/ct2/show/NCT0424329

Strengths

1. This nationwide study will determine the prevalence and predictors of RCI among Malaysian medical doctors.
2. The outcome of this study will provide important information for preventative measures to address the RCI among medical doctors.

Limitations

3. The use of non-probability sampling will introduce selection bias into the study even though it is economical and logistically advantageous.
4. The response rate will be partially influenced by the internet capability and IT literacy of the participants.

INTRODUCTION

Road crash involvement (RCI) and injuries are one of the major public health problems globally. The International Labour Organisation (ILO) reports that 2.2 million deaths are recorded every year, and 158,000 are due to commuting accidents. Commuting accident is defined as "any accident happening while travelling on a route between a place of residence to a place of work: travelling on a journey made for any reason which is directly connected to employment; or travelling on a journey during any authorized recess". [1,2] In Europe, 15% of work-related accidents are commuting accidents. [3] In Malaysia, data on work-related accidents as reported by the Social Security Organisation (SOCSO), showed that commuting accidents increased from 31,314 in 2016 to 33,319 accidents in 2017.[4] Commuting accidents contributed almost half (47.61%) of the total accidents in 2017. This shows an increasing trend since 2016. [4] The trend also showed that the accidents are mostly due to travelling to and from work, before morning shift and within 5 kilometres of travel distance, with motorcycle riders having the worse casualties. [5] The issue of medical doctors and commuting accidents has recently been highlighted in the media and scientific writing, calling for urgent action to resolve the problem. [6–8] Reports from the United States of America and Israel indicated that the prevalence of RCI among medical doctors, including those from the Emergency, Anaesthesiology, Medical, Surgical and Paediatric Departments, varies from 7.9% to 24.6%. [9–12] A 1996 study among 70 junior doctors revealed that 44% had fallen asleep when stopped at a traffic light and 49% had fallen asleep at the wheels. Ninety percent of these events occurred after long working hours (post call), and 20 out of 70 doctors were involved in RCI. [9] Findings among US junior doctors also showed that long working hours, particularly extended shifts, led to more RCI. [12] It's not just long hours but the time during which the doctors perform their duties also play a role; RCI is commonly reported after a night shift. [11,13] All the studies mentioned that the link to the RCI was sleep deprivation. [9,11,12] Nonetheless, it is worth mentioning that accidents still occur due to long working hours or night shift, which can be up to 15% of total accidents. [9] Apart from sleep deprivation, working hours

and time of work, other RCI related factors have also been proposed including fatigability.[13] Doctors are known to work long hours, sometimes extending beyond 24 hours, resulting in sleep deprivation and fatigability.[14–16] Fatigue and sleep deprivation have been studied extensively, especially among healthcare professionals, and have been reported to have a negative impact on their work and wellbeing. [17] This includes reduced clinical judgement, impaired neurocognitive functioning, and negative effect on the mood. Reduced attention and reaction time have been shown to have profound impact on driving of a motor vehicle.[17] Sleep-related disturbance such as obstructive sleep apnoea, micro sleep and poor sleep hygiene are also said to affect the driving performance.[18] After examining other contributors of RCI among medical doctors, gender, distance from work, number of dependent children, health status, exercise, and use of medication were associated with RCI among healthcare and allied health professionals.[19,20] The same studies also relate mental health factors, such as work satisfaction and job stress, on driving performance.[19,20] Local data pertaining to this issue is very limited. Ministry of Health Malaysia (MOH) data showed that 554 commuting accidents occurred between the years 2014 to 2016 amongst healthcare personnel. The distribution of commuting accidents, according to job category, revealed that 54% were nurses, followed by medical doctors (6.3%), medical assistants (6.3%), hospital attendants (16.4%), drivers (5.6%), food preparation attendants (2.7%) and others (9.4%). [21] It is obvious that the proportion of doctors involved in RCI is not the highest among healthcare workers; however, doctor numbers are 3-4 times lower than staff nurses, combined with a possibility of under reporting. Also, as the country has heavily invested in training and employment of doctors, this figure will impact the economy and quality of healthcare delivery. [22] A quick online 24-hour survey among Malaysian medical doctors with RCIs experience revealed that more than 440 of them who were admitted between 2009 and 2015 experienced RCI after long hours of work.[23] However, this survey was carried out by medical Non-Governmental Organisations (NGOs) with limitations in its study design, as it was one of the first quick surveys to explore such issue. This was a response of a few road crash fatalities among medical doctors

due to long hours of work. Since then, this issue has been brought up by several other NGOs. Therefore, this suggests that the officially reported numbers is just the tip of the iceberg.

In terms of economic burden, if a medical doctor is involved in a bad or fatal accident, the implications are huge. To put this into perspective, the Malaysian Medical Council (MMC) in coordination with the Malaysian Qualifications Agency (MQA) has ruled that every medical practitioner needs to complete a minimum of five years of undergraduate programme followed with two years of houseman ship training. The total fee for five years of undergraduate training in Malaysia ranges from RM 10,000.00 to RM 450,000.00.[24] On top of this, the total emolument for a medical doctor ranges from RM 4,300.00 to RM 23,000.00 per month depending on the specified salary grades.[22] Thus, losing a medical doctor will cause great financial burden to the economy, country and the families involved.

Due to the aforementioned issue, and the lack of published data, many NGOs have joined together with the help of researchers from local universities to explore and help understand this problem.

Findings of this study will be used to highlight the magnitude of the problem as well as to recommend and assist in developing appropriate intervention module to help doctors combat fatigue, and address factors related to commuting accidents and RCI.

METHODS AND ANALYSIS

Study design

Cross-sectional online questionnaire study

Study area

Malaysia (nation-wide)

Study duration :

April 2020– May 2021

Study participants

Malaysian Medical Association (MMA) members who are fully or partially registered with the Malaysian Medical Council (MMC) and their contacts. MMA is the main representative body for all registered medical practitioners in Malaysia. MMA members include senior and junior doctors, private and public, specialists and general practitioners, medical officers and house officers.

The eligibility criteria are based on the following:

Inclusion Criteria

1. Malaysian citizen
2. Full or partial registration with MMC
3. Work a minimum of six (6) months in the healthcare sector in Malaysia

Exclusion Criteria

1. Medical doctors currently on long leave
2. Does not self-commute to work
3. Those with psychiatric illness

Sample size

The prevalence of RCI among doctors is 7.9-24.6%. [9–12] We choose the prevalence (P) of 25% for cases of RCI as it yields the highest sample size, taking into account 95% confidence level and 5% margin of error. The formula for sample size calculation (single proportion) is as follows:

$$n = z^{2}_{1-\alpha/2} P(1 - P) / d^{2}$$

Where n is the sample size, P is the prevalence of interest, z is the standard normal value corresponding to the desired confidence level (α), and d the maximum error that is allowed (margin of error). Based on this formula, z = 1.96 (confidence level of 95%), α = 5% and d = 0.5. Considering 30% non-response or dropout rate, the sample size is increased from 288 to 375.

Selection criteria

We initially planned to use the systematic random sampling method to select the participants for this study based on the Malaysian Medical Council (MMC) Register. However, based on advice from the MREC on the possible low response rate based on the previous experience, and possible long delay due to administrative issues, MREC have advised online methods and non-probability random sampling among MMA registered member list and their network. The sample will be doctors who are partially or fully registered with the MMC and fulfils the inclusion and exclusion criteria. Eligible participants will need to answer a questionnaire via an online survey link.

Data collection

This study will be in collaboration with the MMA that will recruit subjects along with other medical NGOs including the Islamic Medical Association of Malaysia (IMAM), the lead NGO in this project. MMA will help in dissemination of information through their website as well as

distribute/email the questionnaires to all MMA members and their contacts. Participants will answer the self-administered questionnaire via the online link. The estimated time for participants to complete this questionnaire is 20-30 minutes. The questionnaire will be administered only once to the subjects and the duration of the study is estimated to be one year. Upon completion of the questionnaire, the participants will have no further commitment to this research. However, participants will be informed if the study data is potentially useful to their well-being.

The questionnaire will be created by using Google Form and then will be saved on Google Drive. Then MMA will share the form to all of its members through email. All responses will be saved in the file stored in Google Drive. Once the sample size is acquired, the form will be closed and results will be downloaded for data analysis. The data collected will be recorded in another separate offline document after being retrieved from Google Form and all data in the Google Form will be destroyed.

Data analysis

Data entry and analysis will be undertaken using the 'Statistical Package for Social Sciences' (SPSS) programme, Version 24.0. Statistical significance is decided at $p<0.05$ with 95% confidence interval (CI). Continuous variables will be summarised as means and standard deviations (SDs) for normally distributed data; median and inter quartile range (IQR) for non-normal distribution. Categorical variables will be summarized as frequencies and percentages. Pearson Chi-square tests will be employed to determine statistical significance of differences across categorical variables. Lastly, multiple logistic regression analyses will be undertaken to determine the strength of association between the outcome and factors of interest, adjusting for covariates or confounders. It also allows one to determine important factors affecting the outcome of interest and generating the final model for prediction. Multicollinearity and interactions will be examined to exclude redundant variables and to test for significant interactions among independent variables, respectively. Preliminary Final Model will be assessed using the following Goodness-of-Fit tests: Hosmer-Lemeshow Test, Classification Table, and Area under Receiver

Operating Characteristics (ROC) curve. Primary outcome will be the prevalence of RCI among medical doctors. Secondary outcomes will be associated factors contributing toward RCI that include socio-demographics, health status, workplace information, work commuting information, driving behaviour, involvement in road traffic accident, fatigue, sleep quality, mental health status and work engagement.

Study instrument

Questionnaire / Scoring:

A predetermined self-administered questionnaire (Appendix 1) will be used to measure the socio-demographics, health status, workplace information, work commuting information, driving behaviour, involvement in RCI, fatigue, sleep quality, mental health status and work engagement. All of the questionnaires are free for use as it is public domain, non-commercial and for academic purpose. The questionnaire is divided into six parts:

- **Part A**: This is pertaining to the attributes of the respondents. Details include the sociodemographics, work information, health and lifestyle, and involvement in RCI and near misses. It is divided into four sections as follows:

- Section A consists of six questions on socio-demographics (age, ethnicity, gender, marital status, and educational background).

- Section B consists of seven questions on health status (medical illness, exercise, and smoking status)

- Section C consists of twenty questions on workplace information (length of employment, employer, current position and department, duration of work, work hours, work routine, napping, and exposure to chemicals)

- Section D consists of six questions on work commuting information (including mode of transportation, distance and time travelled). One question on a valid driver's license.

- Section E is on driving behaviour. This has eleven questions (driving habits, speed of driving, occurrences of mind wandering, sudden outbursts, distraction, driving circumstances such as

under alcohol influence, history of nodding off and falling asleep while driving, losing focus while driving, consuming substance before and while driving, and driving for fun).

- **Section F** is involvement in RCI. This consists of 24 questions (involvement in RCI, near miss accident, explaining the worse encountered accident, injury and its losses).

Part B: (Appendix 2) pertaining to the sleep quality using the Pittsburgh Sleep Quality Index (PSQI).[25] The PSQI assesses the quality and patterns of sleep, differentiating "poor" and "good" sleep using a measurement of seven items: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction over the last month. Scoring of answers is based on a 0-to-3 scale, whereby 3 reflects the negative extreme on the Likert Scale. The score for each component will be summed up as the Global PSQI score. A Global PSQI score of "5" or greater indicates a "poor sleeper".

Part C: (Appendix 3) pertaining to the level of fatigue using the Checklist of Individual Strength Questionnaire (CISQ).[26] in English and Malay Language as obtained from a prior MIROS study. The CISQ is a 20-item questionnaire designed to measure aspects of fatigue and asking respondents of their feelings during the preceding two weeks. It is a self-report and consists of four components identified via factor analysis for subjective experience of fatigue (8 items), concentration (5 items), motivation (4 items), and level of physical activity (3 items). The total scale has a Cronbach's alpha of 0.93, and is scored using the 7-point Likert scale. Higher scores indicate higher degree of fatigue, more concentration problems, reduced motivation, and less physical activity. A composite CISQ score that ranges between 20 and 140 is constructed by summing up individual scores from all four components to capture the subjective sensation of fatigue and reduced functioning (i.e. concentration, motivation, and activity level). Case classification is obtained by implementing a cut-off CISQ point of >76; those who scored more than 76 are designated as probable fatigue case. This cut-off value was established in a different pilot study using defined samples with differences

in the fatigue level. This questionnaire has been validated and has been used for other studies. Therefore, no validation process is required for this questionnaire.

Part D: (Appendix 4) has 2 versions . The original version has 42 questions, and the shorter version is the Depression Anxiety and Stress Score consisting of 21 items (DASS 21). The scores will categorise individuals into low, moderate or severe in each domain. Both questionnaires have a Cronbach's alpha score of 0.96 to 0.97 for DASS-Depression, 0.84 to 0.92 for DASS-Anxiety, and 0.90 to 0.95 for DASS Stress. Studies have found this tool to be a good tool to assess general and clinic based population. For this study the DASS 21 will be used as it is shorter, and more convenient .[27,28]

Part E: (Appendix 5) The Utrecht's Work Engagement Scale (UWES) assesses positive psychological well-being of employees while at work. [29] It consists of 17 items, categorised under the dimensions of vigour, dedication and absorption. Each item is scored on a 7-point scale ranging from 0 (never) to 6 (everyday). Cronbach's alpha score for vigour ranged between 0.75 to 0.85, 0.86 to 0.90 for dedication and 0.82 to 0.88 for absorption. Higher scores indicate higher work engagement and lower burnout rates.

Validation of questionnaires

All these questionnaires have already been validated in Malaysia except for the socio-demographics, health status, workplace information, work commuting information, driving behaviour, and involvement in road traffic accident. Validation for this section will be done using face and content validation. Face validation will be done with 10% calculated sample size and content validation will be done with expert panel consisting of 2 Family Medicine specialists and 3 Public Health Medicine specialists. Pittsburgh Sleep Quality Index (PQSI), Checklist of Individual Strength Questionnaire (CISQ), DASS (Depression, Anxiety and Stress)-21 and Utrecht's Work

Engagement Scale (UWES) will be validated using a small sample of Malaysian medical doctors. Post validation changes will be made to the questionnaire before recruitment.

Patient and Public Involvement Statement

No patients involved.

Ethical considerations

This study has received the approval for ethics clearance from the Medical Research and Ethics Committee (MREC), Ministry of Health Malaysia (NMRR-18-3983-40609) and the Ethics Committee for Research Involving Human Subjects, University Putra Malaysia (JKEUPM). Written informed consent will be obtained from each study participant and it will be stated at the beginning of the questionnaire. They will not be required to sign into an account in order to fill in the survey. They will also be told the right not to respond to the questions if they don't want to. All data will be kept confidential for research purposes only and will not be disclosed to any third parties. For publication, all personal information will be de-identified to protect the identity of the participants. Google Form responses are stored in a worksheet that can only be accessed through a Google login; only two of the researchers have access to this. The account is password protected. Data collected will be recorded in another separate offline document after being retrieved from Google Form and all data in the Google Form will be destroyed. Research data will only be accessed by the two researchers, above. The data will be stored for at least seven years from the date of final publication.

Dissemination

Results of this study will be disseminated by publication through peer-reviewed professional and scientific journals. The participants' data will be kept confidential and will not be shared with the public. If there are requests for data sharing for appropriate research purposes, this will be

considered on an individual basis after the trial completion and after the publication of the primary manuscripts.

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Conflict of interests: none.

Contributors Study design: AAR, NKD, RN, AFI, AMQ, KII, SVW. Drafting the work and revising critically for important intellectual content: AAR, NKD, FM, RN, HMY. Final approval of the version to be published: AAR, NKD, RN, AFI, AMQ, KII, SVW, FM, HMY

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Data sharing statement Researchers wishing to use the data obtained from this study should contact Aneesa Abdul Rashid (aneesa@upm.edu.my), the Principal Investigator.

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APPENDIX 1

Prevalence of Road Crash Involvement and Associated Factors Among Medical Doctors in Malaysia

Assalamualaikum & Selamat Sejahtera.

We are part of a research team looking into Medical Doctors and Road Crash Prevalence

We would like to invite all doctors that fit the following criteria to participate in this questionnaire to help us find out more on this essential issue. Your help will assist us on the welfare of healthcare professionals generally and medical doctors specifically

Inclusion Criteria:
1.Malaysian citizen
2.Full or partial registration with MMC
3.Work a minimum of six (6) months in the healthcare sector in Malaysia

Exclusion Criteria:
1.Medical doctors currently on a long leave.
2.Does not self-commute to work
3.Those with psychiatric illness

The survey is very brief and will only take about 20-30 minutes to complete. The response will be confidential and to be used for academic purposes only.

Your participation in this survey is voluntary. If you decide to withdraw from the study midway, you could exit the site freely and no measures will be used to preserve the data you have filled in, thus all data will be destroyed.

Thank you, we appreciate your valuable time and kind cooperation towards this noble cause.

Dr Halidah Mohd Yusuf (limy611@gmail.com)

Dr Aneesa Abdul Rashid (aneesa@upm.edu.my)

on behalf of the research team

* Required

PARTICIPANT INFORMATION SHEET AND INFORMED CONSENT FORM
(for adult subjects)

1. **Title of study**: The Prevalence of Road Crash Involvement and its Associated Factors among Medical Doctors in Malaysia

2. **Name of investigator and institution**: Dr Aneesa Abdul Rashid, Universiti Putra Malaysia

3. **Name of sponsor**: Fundamental Research Grant Scheme (Kemeterian Pendidikan Tinggi)

4. **Introduction**:

   It is important that you understand why the research is being done and what it will involve. Please take your time to read through and consider this information carefully before you decide if you are willing to participate. Ask the study staff if anything is unclear or if you would like more information. After you are properly satisfied that you understand this study, and that you wish to participate, you must sign this informed consent form.

   Your participation in this study is voluntary. You do not have to be in this study if you do not want to. You may also refuse to answer any questions you do not want to answer. If you volunteer to be in this study, you may withdraw from it at any time. If you withdraw, any data collected from you up to your withdrawal will still be used for the study. Your refusal to participate or withdrawal will not affect any medical or health benefits to which you are otherwise entitled.

   This study has been approved by the Medical Research and Ethics Committee, Ministry of Health Malaysia.

5. **What is the purpose of the study?**

   The purpose of this study is to investigate the prevalence of road crash involvement and its associated factors among medical doctors in Malaysia. This research is necessary to understand the causes of road crash accidents among doctors in Malaysia

   A total of 375 subjects like you will be participating in this study in Malaysia. The whole study will last about *1 year*.

6. **What are my responsibilities when taking part in this study?**

   It is important that you answer all of the questions asked by the study staff honestly and completely. You will be given a survey form to be answered. This form contains 10 sections which will enquire about sociodemography, health status, workplace information, work commuting information, driving behavior, involvement in road traffic accident, sleep quality, individual strength score, depression, anxiety and stress score, and work engagement scale. The estimated time for participants to complete this questionnaire is around 20-30 minutes. The questionnaire will only be administered once to the subjects although the duration of the study

is estimated for a year. Upon completion of the questionnaire the participants will have no further commitment to this research.

7. **What are the potential risks and side effects of being in this study?**
Participation to this study will not affect your treatment, and the risk is minimal. You are free to decline to answer any of the questions that you feel uncomfortable with.

8. **What are the benefits of being in this study?**

There may or may not be any benefits to you. Information obtained from this study will help for the participant to know if they have any of the risks of having traffic accident, and if there is a risk, then they may take precaution to prevent this from happen.

9. **Who is funding the research?**

This study is sponsored by FRGS by Ministry of Higher Education. You will not be paid for participating in this study.

10. **Will my medical information be kept private?**

All your information obtained in this study will be kept and handled in a confidential manner, in accordance with applicable laws and/or regulations. When publishing or presenting the study results, your identity will not be revealed without your expressed consent. Individuals involved in this study, qualified monitors and auditors, and governmental or regulatory authorities may inspect the study data, where appropriate and necessary.

11. **Who should I call if I have questions?**

If you have any questions about the study or if you think you have a study related injury and you want information about this study, please contact the study doctor, Dr Aneesa Abdul Rashid at telephone number *017 3293060.*

If you have any questions about your rights as a participant in this study, please contact: The Secretary, Medical Research & Ethics Committee, Ministry of Health Malaysia, at telephone number 03-3362 8407/8205/8888.

INFORMED CONSENT FORM

Title of Study: The Prevalence of Road Crash Involvement and its Associated Factors among Medical Doctors in Malaysia

By signing below I confirm the following:

- I have been given oral and written information for the above study and have read and understood the information given.
- I have had sufficient time to consider participation in the study and have had the opportunity to ask questions and all my questions have been answered satisfactorily.
- I understand that my participation is voluntary and I can at anytime free withdraw from the study without giving a reason and this will in no way affect my future treatment. I am not taking part in any other research study at this time. I understand the risks and benefits, and I freely give my informed consent to participate under the conditions stated. I understand that I must follow the study doctor's (investigator's) instructions related to my participation in the study.
- I understand that study staff, qualified monitors and auditors, the sponsor or its affiliates, and governmental or regulatory authorities, have direct access to my medical record in order to make sure that the study is conducted correctly and the data are recorded correctly. All personal details will be treated as STRICTLY CONFIDENTIAL
- I will receive a copy of this subject information/informed consent form signed and dated to bring home.
- I agree/disagree* for my family doctor to be informed of my participation in this study. *(*delete which is not applicable)*

Subject:

Signature: I/C number:

Name: Date:

Investigator conducting informed consent:

Signature: I/C number:

Name: Date:

Impartial witness:

Signature: I/C number:

Name: Date:

1. I hereby acknowledge that I have read and understood all the information above. *

Check all that apply.

- [ ] I agree
- [ ] I disagree

Section A

SOCIODEMOGRAPHIC QUESTIONNAIRE

2. MMC number

3. Age (years) *

_____

4. Gender *

Mark only one oval.

- ◯ Male
- ◯ Female

5. Ethnicity *

Mark only one oval.

- ◯ Malay
- ◯ Chinese
- ◯ Indian
- ◯ Indian Muslim
- ◯ Eurasian
- ◯ Sikh
- ◯ Indonesian
- ◯ Siam
- ◯ Other: _____

6. Martial status *

Mark only one oval.

- ◯ Married
- ◯ Single
- ◯ Separated
- ◯ Divorced
- ◯ Widower

7. Highest educational background (for others, please state) *

Mark only one oval.

- ◯ Basic medical degree
- ◯ Post-graduate diploma
- ◯ Master of Medicine
- ◯ PhD
- ◯ Passed dfm 2019
- ◯ Current master student
- ◯ Current PhD student
- ◯ MRCP (UK)
- ◯ Mrcpch
- ◯ DRM
- ◯ Masters Dermatology (UK)
- ◯ MHA
- ◯ Master Ophthalmology (UKM)
- ◯ FRCGP
- ◯ Other: _____

Section B

Health Status

8. Do you suffer from any medical illness?

Mark only one oval.

- ◯ Yes
- ◯ No

9. If yes please specify

Mark only one oval.

- ◯ Diabetes Mellitus
- ◯ Hypertension
- ◯ Ischemic Heart Disease
- ◯ Stroke
- ◯ Epilepsy
- ◯ Mental Health
- ◯ Asthma
- ◯ Gout
- ◯ pulmonary sarcoidosis
- ◯ Rheumatoid arthritis
- ◯ Psoriasis
- ◯ hyperthyroid
- ◯ OSA
- ◯ Other: _____

10. Do you perform regular exercise? *

Mark only one oval.

	1	2	3	4	5	
Never	◯	◯	◯	◯	◯	Always

11. If yes, please specify frequency

Mark only one oval.

- ◯ 1-2 days per week
- ◯ 3-4 days per week
- ◯ 5-6 days per week
- ◯ Everyday

12. Specify total number of hours per week

13. Do you smoke? *

Mark only one oval.

	1	2	3	4	5	
Never	◯	◯	◯	◯	◯	Always

14. If yes, please specify amount of cigarette sticks per day

Section c

Workplace Information

15. Length of employment (years), if not applicable, please put "0" *

16. Length of employment (months), please put "-" if not applicable

17. Employer Type *

Mark only one oval.

- ◯ Public institution
- ◯ Private institution
- ◯ Self-employed

18. Current Department (Specify) *

_____

19. Position *

Mark only one oval.

- ◯ Houseman
- ◯ Medical Officer
- ◯ Post-graduate Trainee
- ◯ Specialist
- ◯ Consultant

20. Duration of current work experience (years), if not applicable put "-" *

_____

21. Duration of current work experience (months), if not applicable put "-"

_____

22. Average work hours per week (hours) *

_____

23. Work routine (if others please explain) *

Mark only one oval.

- ◯ Office hours
- ◯ Shift work
- ◯ On-call system
- ◯ Flexi hours
- ◯ thesis and field attachment at district health office
- ◯ office hours and after office hours - due to labour and delivery
- ◯ Long hours as it's a GP clinic.
- ◯ Office hours and oncalls
- ◯ office hours and after office hours - due to oncall and OT
- ◯ Office hours and after office hours - due to heavy workload
- ◯ Other: _____

24. If on-call system : (please describe general system; eg. average oncall frequency, do you work the day after postcall? if yes how many hours)

_____

_____

_____

_____

_____

25. If shift/ flexi hour system : (Please describe general system; eg. duration for each shift)

_____

_____

_____

_____

_____

26. If others : (please state general system; eg. duration of every working period)

27. State your total official working hours (in hours) 1 week ago (eg. 56 hours).

28. State your total official working hours (in hours) 2 weeks ago (eg. 40 hours).

29. Do you do overtime? *

Mark only one oval.

- Yes
- No

30. If you do overtime, how many hours per day?

31. If you do overtime, how many days per week?

32. Do you practice napping during work? *

Mark only one oval.

- ◯ No
- ◯ Yes

33. If yes, estimate how many hours per day? (hours/day)

_____

34. Do you get exposure to chemical/gases/solvents at workplace? *

Mark only one oval.

- ◯ Yes
- ◯ No

Section D

Work Commuting Information

35. Do you have a valid driving license?

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Prefer not to mention

36. Mode of transportation to commute to work (you may pick more than one) *

Check all that apply.

- ☐ Motorbike/scooter
- ☐ Car
- ☐ Walk
- ☐ bus

Other: ☐ _____

37. if others, please state

_____

38. How far is your work place from your home? Please estimate the distance in kilometres (km).

_____

39. State total time in minutes per day commuting TO work (in minutes)

_____

40. Commuting start time TO work

_____

Example: 8:30 AM

41. State total time in minutes per day commuting FROM work TO home (in minutes)

_____

42. Commuting start time FROM work

_____

Example: 8:30 AM

Section E

Driving behavior

Please grade from 1 (Never) to 5 (Always) regarding your driving behavior. Please be as honest as possible.

43. Type of driver. *

Mark only one oval per row.

	(Never) 1	2	3	4	5 (Always)
Careful	◯	◯	◯	◯	◯
Follows traffic regulation	◯	◯	◯	◯	◯

44. Do you practice the following habits? : *

Mark only one oval per row.

	(Never) 1	2	3	4	5 (Always)
Give signal when overtaking, changing lane, or turning	◯	◯	◯	◯	◯
Keep safe distance from the vehicle in front	◯	◯	◯	◯	◯
Drive more carefully when raining	◯	◯	◯	◯	◯
Wear seatbelt when in vehicle	◯	◯	◯	◯	◯
Wear helmet when riding motorbike	◯	◯	◯	◯	◯
Strictly follow vehicle's manufacturer maintenance schedule	◯	◯	◯	◯	◯
Follow speed limit	◯	◯	◯	◯	◯

45. Driving speed *

Mark only one oval.

	1	2	3	4	5	
Slow	◯	◯	◯	◯	◯	Fast

46. Have you experienced the following driving? *

Mark only one oval per row.

	1 (Never)	2	3	4	5 (Always)
Mind-wandering state	◯	◯	◯	◯	◯
Sudden outburst of anger	◯	◯	◯	◯	◯
Distraction	◯	◯	◯	◯	◯

47. Have you driven under the following circumstances? *

Mark only one oval per row.

	1 (Never)	2	3	4	5 (Always)
While using hand-held device	◯	◯	◯	◯	◯
When tired	◯	◯	◯	◯	◯
In a bad mood	◯	◯	◯	◯	◯
Under mental distress/duress	◯	◯	◯	◯	◯
Under alcohol or recreational drug influence	◯	◯	◯	◯	◯

48. Within the LAST 2 WEEKS, have you ever done any of the following while commuting to and from work? *

Mark only one oval per row.

	1 (Never)	2	3	4	5 (Always)
Nodded off while driving	◯	◯	◯	◯	◯
Nodded off while stopping	◯	◯	◯	◯	◯

49. Within the LAST 2 WEEKS, have you ever done any of the following while commuting to and from work?

Mark only one oval per row.

	1 (Never)	2	3	4	5 (Always)
Fall asleep while driving					
Fall asleep while stopping (eg. at traffic light)					

50. Within the LAST 2 WEEKS, have you ever done any of the following while commuting to and from work?

Mark only one oval per row.

	1 (Never)	2	3	4	5 (Always)
Lost focus while driving					
Lost focus while stopping (eg. at traffic light)					

51. Do you consume any of the following substance BEFORE driving? *

Mark only one oval per row.

	1 (Never)	2	3	4	5 (Always)
Caffeinated drinks (tea,coffee,colas)					
Prescription medication					
Traditional supplements					
Alcohol					

52. Do you consume any of the following substance DURING driving? *

Mark only one oval per row.

	1 (Never)	2	3	4	5 (Always)
Caffeinated drinks (tea,coffee,colas)	◯	◯	◯	◯	◯
Prescription medication	◯	◯	◯	◯	◯
Traditional supplements	◯	◯	◯	◯	◯
Alcohol	◯	◯	◯	◯	◯

53. Do you drive for fun? *

Mark only one oval.

	1	2	3	4	5	
Never	◯	◯	◯	◯	◯	Always

Section F

Involvement In Road Traffic Accident

54. Since you started driving have you ever been involved in road traffic accident?

Mark only one oval.

◯ Yes

◯ No

55. If yes, please choose number of times

Mark only one oval.

- ◯ Once
- ◯ Twice
- ◯ Thrice
- ◯ Several

56. For the past 2 weeks, have you NEARLY BEEN INVOLVED in a road accident due to: *

Mark only one oval per row.

	1 (Never)	2	3	4	5 (Always)
Tiredness	◯	◯	◯	◯	◯
Nodding off	◯	◯	◯	◯	◯
Sleepiness	◯	◯	◯	◯	◯

57. If yes, please choose number of times

Mark only one oval.

- ◯ Once
- ◯ Twice
- ◯ Thrice
- ◯ Several

58. For the past 2 weeks, have you BEEN INVOLVED in a road accident due to: *

Mark only one oval per row.

	Yes	No
Tiredness	◯	◯
Nodding off	◯	◯
Sleepiness	◯	◯

59. If yes, please choose number of times

Mark only one oval.

- ◯ Once
- ◯ Twice
- ◯ Thrice
- ◯ Several

60. Please describe below the worst accident you have encountered during work commute

61. Did this happened the last 2 weeks?

Mark only one oval.

- ◯ Yes
- ◯ No

62. If no please state when.

_____

Example: January 7, 2019

63. Please describe the intensity of accident encountered

Mark only one oval.

	1	2	3	4	5	
Mild	◯	◯	◯	◯	◯	Severe

64. What is the number of vehicles involved ?

Mark only one oval.

- ◯ One
- ◯ Two
- ◯ More than two

65. What is the estimated cost of vehicles repairs (RM)?

_____

66. Did anyone sustain injury during the accident?

Mark only one oval.

- ◯ Yes
- ◯ No

67. If yes, please specify who

Mark only one oval.

- ◯ Yourself
- ◯ Others
- ◯ Both

68. What was the severity of injury?

Mark only one oval.

	1	2	3	4	5	
Mild	◯	◯	◯	◯	◯	Severe

69. Were there any disability after accident?

Mark only one oval.

- ◯ Yes
- ◯ No

70. If yes, please specify if:

Mark only one oval.

- ◯ Temporary
- ◯ Permanent

71. What was the total cost of treatment (RM)?

_____

72. Was there any medical leave required post-injury?

Mark only one oval.

- Yes
- No

73. If yes, specify number of days

_____

74. Was the injury compensated by insurance?

Mark only one oval.

- Yes
- No

75. Was there any fatality during the accident?

Mark only one oval.

- Yes
- No

76. Do you practice other activities while driving to keep you alert to avoid sleepiness/microsleep?

Mark only one oval.

- Yes
- No

77. If yes, please specify

Mark only one oval.

- ◯ By entertainment system (radio/CD player/TV, etc)
- ◯ Talking with fellow car occupant
- ◯ Looking at surrounding

APPENDIX 2

PITTSBURGH SLEEP QUALITY INDEX QUESTIONNAIRE

78. 1. During the past month, what time have you usually gone to bed at night? *

_____

Example: 8:30 AM

79. 2. During the past month, how long (in minutes) has it usually taken you to fall asleep each night? *

_____

80. 3. During the past month, what time have you usually gotten up in the morning? *

_____

Example: 8:30 AM

81. 4. During the past month, how many hours of actual sleep did you get at night? (This may be different than the number of hours you spent in bed) *

_____

82. 5. During the past month, how often have you had trouble sleeping because you :

_____

83. a) Cannot get to sleep within 30 minutes *

Mark only one oval.

- Not during the past month
- Less than once a week
- Once or twice a week
- Three or more times a week

84. b) Wake up in the middle of the night or early morning *

Mark only one oval.

- Not during the past month
- Less than once a week
- Once or twice a week
- Three or more times a week

85. c) Have to get up to use bathroom *

Mark only one oval.

- Not during the past month1
- Less than once a week
- Once or twice a week
- Three or more times a week

86. d) Cannot breathe comfortably *

Mark only one oval.

- Not during the past month
- Less than once a week
- Once or twice a week
- Three or more times a week

87. e) Cough or snore loudly *

Mark only one oval.

- Not during the past month
- Less than once a week
- Once or twice a week
- Three or more times a week

88. f) Feel too cold *

Mark only one oval.

- Not during the past month
- Less than once a week
- Once or twice a week
- Three or more times a week

89. g) Feel too hot *

Mark only one oval.

- Not during the past month
- Less than once a week
- Once or twice a week
- Three or more times a week

90. h) Have bad dreams *

Mark only one oval.

- Not during the past month
- Less than once a week
- Once or twice a week
- Three or more times a week

91. i) Have pain *

Mark only one oval.

- ◯ Not during the past month
- ◯ Less than once a week
- ◯ Once or twice a week
- ◯ Three or more times a week

92. j) Other reason(s), please describe. *

_____

_____

_____

_____

_____

93. How often you have had trouble sleeping because of this reason(s): *

Mark only one oval.

- ◯ Not during the past month
- ◯ Less than once a week
- ◯ Once or twice a week
- ◯ Three or more times a week

94. 6) During the past month, how often have you taken medicine (prescribed or "over the counter") to help you sleep? *

Mark only one oval.

- ◯ Not during the past month
- ◯ Less than once a week
- ◯ Once or twice a week
- ◯ Three or more times a week

95. 7) During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity? *

Mark only one oval.

- Not during the past month
- Less than once a week
- Once or twice a week
- Three or more times a week

96. 8) During the past month, how much of a problem has it been for you to keep up enthusiasm to get things done? *

Mark only one oval.

- Not during the past month
- Less than once a week
- Once or twice a week
- Three or more times a week

97. 9) During the past month, how would you rate your sleep quality overall? *

Mark only one oval.

- Very good
- Fairly good
- Fairly bad
- Very bad

APPENDIX 3

CHECKLIST INDIVIDUAL STRENGTH QUESTIONNAIRE

Instruction

On the next page you find 20 statements. With these statements we wish to get an impression of how you have felt during "the pass two weeks".

*If you feel that this statement is true, click in the left box,
*If you feel that this statement is not true at all, click in the right box,
*If you fell that this statement is not "yes, that is true", but also not "no, that is not true", click in the box that is most in accordance with how you feel.

98. 1) I feel tired *

Mark only one oval.

	1	2	3	4	5	6	7	
Yes, that is true	◯	◯	◯	◯	◯	◯	◯	No, that is not true

99. 2) I feel very active *

Mark only one oval.

	1	2	3	4	5	6	7	
Yes, that is true	◯	◯	◯	◯	◯	◯	◯	No, that is not true

100. 3) Thinking requires effort *

Mark only one oval.

	1	2	3	4	5	6	7	
Yes, that is true	◯	◯	◯	◯	◯	◯	◯	No, that is not true

101. 4) Physically I feel exhausted *

Mark only one oval.

	1	2	3	4	5	6	7	
Yes, that is true	◯	◯	◯	◯	◯	◯	◯	No, that is not true

102. 5) I feel like doing all kinds of nice things *

Mark only one oval.

	1	2	3	4	5	6	7	
Yes, that is true	◯	◯	◯	◯	◯	◯	◯	No, that is not true

103. 6) I feel fit *

Mark only one oval.

	1	2	3	4	5	6	7	
Yes, that is true	◯	◯	◯	◯	◯	◯	◯	No, that is not true

104. 7) I do quite a lot within a day *

Mark only one oval.

	1	2	3	4	5	6	7	
Yes, that is true	◯	◯	◯	◯	◯	◯	◯	No, that is not true

105. 8) When I am doing something, I can concentrate quite well *

Mark only one oval.

	1	2	3	4	5	6	7	
Yes, that is true	◯	◯	◯	◯	◯	◯	◯	No, that is not true

106. 9) I feel weak *

Mark only one oval.

	1	2	3	4	5	6	7	
Yes, that is true								No, that is not true

107. 10) I don't do much during the day *

Mark only one oval.

	1	2	3	4	5	6	7	
Yes, that is true								No, that is not true

108. 11) I can concentrate well *

Mark only one oval.

	1	2	3	4	5	6	7	
Yes, that is true								No, that is not true

109. 12) I feel rested *

Mark only one oval.

	1	2	3	4	5	6	7	
Yes, that is true								No, that is not true

110. 13) I have trouble concentrating *

Mark only one oval.

	1	2	3	4	5	6	7	
Yes, that is true								No, that is not true

111. 14) Physically I feel I am in a bad condition *

Mark only one oval.

	1	2	3	4	5	6	7	
Yes, that is true								No, that is not true

112. 15) I am full of plans *

Mark only one oval.

	1	2	3	4	5	6	7	
Yes, that is true								No, that is not true

113. 16) I get tired very quickly *

Mark only one oval.

	1	2	3	4	5	6	7	
Yes, that is true								No, that is not true

114. 17) I have a low output *

Mark only one oval.

	1	2	3	4	5	6	7	
Yes, that is true								No, that is not true

115. 18) I feel no desire to do anything *

Mark only one oval.

	1	2	3	4	5	6	7	
Yes, that is true								No, that is not true

116. 19) My thoughts easily wander *

Mark only one oval.

	1	2	3	4	5	6	7	
Yes, that is true								No, that is not true

117. 20) Physically I feel in a good shape *

Mark only one oval.

	1	2	3	4	5	6	7	
Yes, that is true								No, that is not true

APPENDIX 4

DASS 21 QUESTIONNAIRE

Please read each statement and click on a number 0,1,2,3 which indicates how much the statement applied to you over the past week. There are no right or wrong answers. Do not spend too much time on any statement

The rating scale is as follows
0 Did not apply to me at all
1 Applied to me to some degree, or some
2 Applied to me a considerable degree, or a good part of time
3 Applied to me very much, or most of the time

118. 1. I found it hard to wind down *

Mark only one oval.

0	1	2	3
◯	◯	◯	◯

119. 2. I was aware of dryness of my mouth *

Mark only one oval.

0	1	2	3
◯	◯	◯	◯

120. 3. I couldn't seem to experience any positive feeling at all *

Mark only one oval.

0	1	2	3
◯	◯	◯	◯

121. 4. I experienced breathing difficulty (eg, excessive rapid breathing, breathlessness in the absence of physical exertion) *

Mark only one oval.

0	1	2	3
◯	◯	◯	◯

122. 5. I found it difficult to work up the initiative to do things *

Mark only one oval.

0	1	2	3
◯	◯	◯	◯

123. 6. I tended to over-react to situations *

Mark only one oval.

0	1	2	3
◯	◯	◯	◯

124. 7. I experienced trembling (eg, in the hands) *

Mark only one oval.

0	1	2	3
◯	◯	◯	◯

125. 8. I felt that I was using a lot of nervous energy *

Mark only one oval.

0	1	2	3
◯	◯	◯	◯

126. 9. I was worried about situation in which I might panic and make a fool of myself *

Mark only one oval.

0	1	2	3
◯	◯	◯	◯

127. 10. I felt that I had nothing to look foward to *

Mark only one oval.

0	1	2	3
◯	◯	◯	◯

128. 11. I found myself getting agitated *

Mark only one oval.

0	1	2	3
◯	◯	◯	◯

129. 12. I found it difficult to relax *

Mark only one oval.

0	1	2	3
◯	◯	◯	◯

130. 13. I felt down-hearted and blue *

Mark only one oval.

0	1	2	3
◯	◯	◯	◯

131. 14. I was intolerant of anything that kept me from getting on with what I was doing *

Mark only one oval.

0	1	2	3
◯	◯	◯	◯

132. 15. I felt I was close to panic *

Mark only one oval.

0	1	2	3
◯	◯	◯	◯

133. 16. I was unable to become enthusiastic about anything *

Mark only one oval.

0	1	2	3
◯	◯	◯	◯

134. 17. I felt I wasn't worth much as a person *

Mark only one oval.

0	1	2	3
◯	◯	◯	◯

135. 18. I felt that I was rather touchy *

Mark only one oval.

0	1	2	3
◯	◯	◯	◯

136. 19. I was aware of the action of my heart in the absence of physical exertion (eg, sense of heart rate increase, heart missing a beat) *

Mark only one oval.

0	1	2	3
◯	◯	◯	◯

137. 20. I felt scared without any good reason *

Mark only one oval.

0	1	2	3
◯	◯	◯	◯

138. 21. I felt that life was meaningless *

Mark only one oval.

0	1	2	3
◯	◯	◯	◯

APPENDIX 5

UTRECHT'S WORK ENGAGEMENT SCALE (UWES) QUESTIONNAIRE

The following 17 statements are about how you feel at work. Please read each statement carefully and decide if you ever feel this way about your job. If you have never had this feeling, click the "0" (zero) in the space after the statement. If you have had this feeling, indicate how often you feel it by clicking the number (from 1 to 6) that best describes how frequently you feel that way.

Score	Description
0	Never
1	Almost never (A few times a year or less)
2	Rarely (Once a month or less)
3	Sometimes(A few times a month)
4	Often (Once a week)
5	Very often (A few times a week)
6	Always (Everyday)

139. F1. At my work, I feel bursting with energy *

Mark only one oval.

	0	1	2	3	4	5	6	
Never	◯	◯	◯	◯	◯	◯	◯	Everyday

140. F2. I find the work that I do full of meaning and purpose *

Mark only one oval.

	0	1	2	3	4	5	6	
Never								Everyday

141. F3. Time flies when I'm working *

Mark only one oval.

	0	1	2	3	4	5	6	
Never								Always

142. F4. At my job, i feel strong and vigorous *

Mark only one oval.

	0	1	2	3	4	5	6	
Never								Always

143. F5. I am enthusiastic about my job *

Mark only one oval.

	0	1	2	3	4	5	6	
Never								Always

144. F6. When I am working, I forgot everything else around me *

Mark only one oval.

	0	1	2	3	4	5	6	
Never	◯	◯	◯	◯	◯	◯	◯	Always

145. F7. My job inspires me *

Mark only one oval.

	0	1	2	3	4	5	6	
Never	◯	◯	◯	◯	◯	◯	◯	Always

146. F8. When I get up in the morning, I feel like going to work *

Mark only one oval.

	0	1	2	3	4	5	6	
Never	◯	◯	◯	◯	◯	◯	◯	Always

147. F9. I feel happy when I am working intensely *

Mark only one oval.

	0	1	2	3	4	5	6	
Never	◯	◯	◯	◯	◯	◯	◯	Always

148. F10. I am proud of the work that I do *

Mark only one oval.

	0	1	2	3	4	5	6	
Never	◯	◯	◯	◯	◯	◯	◯	Always

149. F11. I am immersed in my work *

Mark only one oval.

	0	1	2	3	4	5	6	
Never	◯	◯	◯	◯	◯	◯	◯	Always

150. F12. I can continue working for very long periods at a time *

Mark only one oval.

	0	1	2	3	4	5	6	
Never	◯	◯	◯	◯	◯	◯	◯	Always

151. F13. To me, my job is challenging *

Mark only one oval.

	0	1	2	3	4	5	6	
Never	◯	◯	◯	◯	◯	◯	◯	Always

152. F14. I get carried away when I'm working *

Mark only one oval.

	0	1	2	3	4	5	6	
Never	◯	◯	◯	◯	◯	◯	◯	Always

153. F15. At my job, I am very resilient, mentally *

Mark only one oval.

	0	1	2	3	4	5	6	
Never	◯	◯	◯	◯	◯	◯	◯	Always

154. F16. It is difficult to detach myself from my job *

Mark only one oval.

	0	1	2	3	4	5	6	
Never	◯	◯	◯	◯	◯	◯	◯	Always

155. F17. At my work I always preserve, even when things do not go well *

Mark only one oval.

	0	1	2	3	4	5	6	
Never	◯	◯	◯	◯	◯	◯	◯	Always

156. THANK YOU FOR COMPLETING THIS QUESTIONNAIRE! If you would like updates on our research progress, kindly leave your contact here. We will be in touch