

**Assessment of risk factors associated with work related stress among general  
practitioners and surgeons in Yerevan: a research grant proposal**

Master of Public Health Integrating Experience Project

Research Grant Proposal Framework

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## List of abbreviations

APA	American Psychological Association
EU	European Union
EWCS	European Working Conditions Survey
GP	General practitioners
HSE	Health and Safety executive
NIOSH	National Institute for Occupational Safety and Health
OCB	Organizational Citizenship Behaviors
OIB	Occupational Injury Benefit
PE	Person-environment fit theory
PPS	Probability proportional to size
SI	Sampling Interval
US	United States of America
VIF	Variance inflation factor
WHO	World Health Organization
WRS	Work Related Stress

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## **Executive Summary**

Stress at work place is one of the growing public health threats worldwide. WRS is negatively associated with individual and organizational level outcomes. Major risk factors of WRS described in the literature are: work demand, work control, support, workplace relationships, job role, change at workplace and home-work interface. WRS is also prevalent among health care professionals.

WRS is well researched in Europe and in other high income countries. However, very little data is available for low-middle income countries, including Armenia. The proposed study aims to explore the risk factors of WRS among general practitioners and general surgeons working in Yerevan hospitals. Study findings could guide evidence based policy changes towards reducing stress in hospitals' working environment.

The design of proposed study is observational quantitative cross sectional survey. The calculated sample size is 612 -  $n_1$  (306) and  $n_2$  (306). Our sampling strategy will be probability proportional to size (PPS).

The instrument of the study is a self-administered questionnaire, which include: Health and safety executive (HSE) questionnaire, job satisfaction, life satisfaction, self-related health, depression, workplace stress scales.

Data collection will be followed by double entry and data cleaning. Multivariable logistic regression will be used to build a final model and predict risk factors of WRS among general practitioners and general surgeons in Yerevan hospitals.

## 1. Introduction

Stress at workplace is one of the major public health threats and a growing concern worldwide.<sup>1</sup> According to World Health Organization (WHO) “Work-related stress is the response people may have when presented with work demands and pressures that are not matched to their knowledge and abilities and which challenge their ability to cope”.<sup>1</sup> Work related stress (WRS) is also common among health care professionals.<sup>2</sup> WRS is negatively associated with health and welfare of employees, including short and long term physiological, psychological and behavioral changes, which in turn has a negative ramification on efficiency of the organization.<sup>1,3,4</sup> Thus, understanding of risk factors of WRS are important for taking measures at individual and organizational levels.<sup>5</sup> Situations and factors related to WRS described in the literature include: work demand, work control, support, workplace relationships, job role, change at workplace<sup>1</sup> and home-work interface.<sup>1,6-11</sup> EU countries and other high income countries including the USA recognized the impacts of WRS on employees. However, several low and middle income countries are yet to prioritize work related stress and stress related negative outcomes.<sup>1</sup>

## 2. Risk factors of work-related stress

There are several theories elucidating the relationships between WRS and work environment, those are “the person-environment (PE) fit theory, the framework of occupational stress, and the demand control-support model.”<sup>12</sup>

***Person-environment fit theory*** states that “stress occurs from a misfit between person and environment.”<sup>12,13</sup> This situation occurs when employees, perceive that their work environment

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<sup>1</sup>Organization can undergo transition or transformation of a function, method or thing

defined by job requirements, role expectations, and organizational norms does not fit with their needs. This experience might result in diverse strains and WRS which can affect employees' physical and mental well-being. This theory states that greater the difference between the person and environment, greater the need for coping and larger the WRS is.<sup>12,13</sup>

*The framework of occupational stress* expands the PE fit theory. It states that, "stress arises when there is a misfit between an employee and his work environment".<sup>14</sup> Physiological, psychological, behavioral aspects, along with personal perceptions of an employee, determines WRS in his work environment.<sup>14</sup> This framework suggests that WRS is a combination of stress from the environment, such as lack of social support and poor quality of interpersonal relationships at workplace and individuals' perception of work environment.<sup>12,14,15</sup>

*The demand-control-support model* suggests that employees' perceptions regarding the job demands and the perceptions regarding level of control in performing the job task interrelate with one another and affects the amount of WRS.<sup>16-18</sup> High work demands and very low control over the work leads to higher amount of WRS among employees.<sup>12,19</sup>

Based on the models described above risk factors associated with WRS are: high work demand, poor work control, low support, poor workplace relationships, job role, change at workplace and home-work interface.<sup>1,6-8</sup> Those risk factors are presented in more details in the sections below.

## **2.1 Work demand**

Work demand refers to those features of work that necessitate persistent physical and/or mental exertion.<sup>20</sup> Work demands become job stressors when more energy is required to meet those demands.<sup>20</sup> Factors that contribute to higher work demand and therefore lead to WRS among physicians are: scarcity of time; problematic work equipment and facilities to adequately



complete the job; work design that involves fragmented and meaningless work; misfit between physicians' work and his/her interpersonal and emotional proficiency; work overload that demands high emotional and mental exertion; work underload with under-use of skills and high ambiguity; handling impractical demands of aggressive customers; working with infected equipment (sharp needles) through which communicable diseases could be spread.<sup>1,6-8,21</sup>

Increased work demands have been recognized as one of the most common sources of WRS. The result of a survey conducted in Germany showed that 67% of employees reported that tight time limit and time pressure resulted in WRS and 47% of workers mentioned that work overload as a contributing factor to WRS.<sup>22</sup> In addition, 52% of the respondents associated their WRS with restricted deadlines or high speed demand at work. About one third of the participants related WRS with information and pressure overload.<sup>22</sup> Unclear boundary with work and relaxation time was also reported to have association with WRS.<sup>22</sup> Several other studies found that white collar professionals including teachers, nurses, doctors experience increased emotional and mental work demands, which are the major risk factors of WRS.<sup>23-25</sup> US workers have reported that, they have lost more productive days at work due to stress, when comparing the year 2007 and 2008.<sup>26</sup> Heavy workloads and lack of opportunity for growth and advancement were among the major stressors among US employees according to American Psychological Association (APA).<sup>26</sup>

## **2.2 Work control**

Work control is a person's capability to influence his/her work environment.<sup>3</sup> Work control include control over: techniques of working, the work place (ability and the authority to make decisions), liberty of movement, technical environment (e.g. work space with wires, technical

assistance and self-knowledge in a situation of hardware crash), social environment and freedom from supervision.<sup>27</sup>

Features of poor work control are excessive responsibility with high levels of unnecessary supervision and surveillance; little or no control over job aspects; low participation, authority and autonomy in decision making; and work involving lack or low influence over work goals and unfair allocation of works and rewards.<sup>1,6-8</sup>

Several studies showed association of work control and WRS. A study explored work stressors such as control over work, job autonomy and their association with psychological wellbeing.<sup>28</sup> Findings show that increase in work control and job autonomy of the employees resulted in decreasing the effects of stressors and improved mental health.<sup>28</sup> Spector et al, findings reaffirm that employees' enhanced control over their work positively influence their health.<sup>29</sup> Bond et al conducted a longitudinal quasi-experimental study with an intervention that aimed to increase the extent of employees' discernment and decision in their work.<sup>3</sup> Results showed significant improvement in workers' mental health, absenteeism rates due to sickness, and self-assessed performance at follow-up; thus confirming that more control over job decreases WRS.<sup>3</sup> Landsbergis et al conducted a study based on a jobs demand-control model and found out that WRS is high risk for employees experiencing heavy work load and less decision making capacity.<sup>30</sup> Fox et al, tested job demand-control model with 136 registered nurses and revealed that jobs that had high work overload and low autonomy were associated with impaired health.<sup>31</sup>

### **2.3 Support**

Support can be defined as emotional, informational and other resources provided by others, including supervisors that help workers to cope better with work related problems.<sup>32</sup> Features of poor work include supervisors' lack of knowledge about and acceptance of the employee; low

support in problem-solving and personal career development; little or no recognition by authorities; low level of appreciation and reward for deserved performance and skills; poor pay; job insecurity; under/over promotion decreases the coping ability and no support to new recruits with less/no instruction on work, from supervisors and peers.<sup>1,6-8</sup>

Several research has shown association between support and WRS.<sup>6,33-36</sup> Bradley et al focused on determining the relationships between perceived social support, work stress and health among 1,162 nurses in England.<sup>32</sup> The results showed that high levels of work related stressors affected health of nurses.<sup>32</sup> Perceived support from the organization was detected as an indicator of better health and reduced WRS among these nurses.<sup>32</sup>

## **2.4 Workplace relationships**

Workplace relationships can be describes as “unique interpersonal relationships with important allegations for the individuals in those relationships, and the organizations in which the relationships exists and develops.”<sup>37</sup>

The factors that might lead to WRS in workplace relationship are: interpersonal conflicts (e.g. bullying and harassment), social isolation, lack of transparency and trust, lack of respect and interpersonal honesty, others taking credit for personal achievement, limited co-worker contribution in group works, lack of emotional support along with unresolved conflicts between peers and supervisors, with prolonged friction and anger.<sup>1,6-8</sup>

An article written by Zapf et al. analyzed the association between work features, social surroundings, mental wellbeing and mobbing at work place.<sup>38</sup> This article defines mobbing at work environment as social separation, assaulting a person’s personal life and attitude , physical aggression, oral belligerence and gossips.<sup>38</sup> Findings show that mobbing has a strong correlation

with poor job satisfaction, poor group dynamics, and poor mental health.<sup>38</sup> Einarsen et al also conducted an exploratory study among 2215 employees to assess the association between hounding and abuse at work and institutional and social work environment.<sup>39</sup> Their findings showed that the incidence of abuse and harassment has a strong correlation with low contentment with management, work control and experience of role conflict.<sup>39</sup> All these measures are indirect indicators of WRS.<sup>38-41</sup>

## **2.5 Job role**

Job role is “a set of connected behaviors, rights, obligations, beliefs, and norms as conceptualized by people in a work environment.”<sup>42</sup>

Studies demonstrated that several negative aspects in role perception are major risk factors for WRS.<sup>43-45</sup> These disturbances in job role include role ambiguity, role conflict and mismatched job demands.<sup>1,6-8</sup>

## **2.6 Change at workplace and home-work interface**

Change at workplace is “process of causing a function, practice, or thing to become different somehow compared to what it is at present or what it was in the past”. Organization can undergo modernization or change in a role, or technique.<sup>46</sup>

Home-work interface is “a form of inter-role conflict in which the role pressures from the work and family domains are mutually incompatible so that participation in one role (home) is made more difficult by participation in another role (work).”<sup>47</sup>

The following are the negative aspects of change at workplace and home-work interface, that can have an adverse outcome on mental health which results in WRS: poorly communicated and managed change process, that make workers anxious and uncertain, hard to adapt changes and

lack of opportunity required to adapt, low support with conflicting and over-demanding work at workplace and home, long unsocial hours (example long travel time), inflexible and unpredictable work schedules are a serious risk factor for WRS among employees.<sup>1,6-8</sup> Several studies have showed strong association between role conflict, change, work-home conflict and WRS.<sup>43,48-50</sup>

Work-home conflict across engineers and nurses were studied by Bacharach et al, role conflict and work overload have an adverse effect on work-home conflict and WRS among the employees.<sup>43</sup> In spite of having different perception on work-family relationships, nurses and engineers referred to work based role-conflict as a significant precursor of work-home conflict, increased WRS.<sup>43</sup> Thomas et al examined the impact of institutional policies that supports family responsibilities on work-family conflict on WRS.<sup>48</sup> Research data from 398 health professionals with family and children were assessed and results showed that poor work control has high negative correlation with work-family interface, thus leading to higher level of WRS, depression and somatic complaints.<sup>48</sup> Bolino et al conducted a research from a sample of 98 couples, that explored the relationship between organizational citizenship behaviors (OCB), in other words, a person's voluntary commitment within an organization, with work-family conflict and WRS.<sup>49</sup> Findings indicate that greater the organizational citizenship behavior, greater is the, work-family conflict and WRS.<sup>49</sup> A study conducted among 163 workers suggests that interactions within work and family significantly impacts work/ life satisfaction and WRS.<sup>50</sup> More level of family's emotional sustenance, was associated with less level of family interference at work.<sup>50</sup>

### **3. Consequences of work-related stress**

WRS has an impact on individuals' physical and mental health negatively, as well as organizational outcomes.<sup>1,51-54</sup>

#### **3.1 The effects of WRS on individual level**

WRS can manifest itself in various ways. WRS may not be detrimental on short term but if stressful situation extends, employees' physical and mental health could be affected,<sup>51</sup> resulting in impaired physiological processes, physical health hazard, poor psychological and mental health outcomes and detrimental behavioral outcomes.<sup>53,54</sup>

##### **3.1.1 Physical health hazards**

Long term exposure to WRS is associated with disturbance and pathological impact on of neuro-endocrine, cardiovascular, autonomic and immunological systems functioning.<sup>55</sup> This could result in headaches, tiredness, slow reactions, sweating, stress related rashes, insomnia and shortness of breath,<sup>51,55</sup> cardio vascular diseases and increased level of stress hormones, such as adrenalin and cortisol.<sup>51,56</sup> Other disorders associated with WRS include skin problems such as eczema and psoriasis<sup>51-54,57</sup>; metabolic disorders such as increased fat oxidation, insulin resistance, metabolic syndrome; musculo-skeletal disorders including structural and functional loss of muscle, soreness, regional pain syndrome, osteoporosis; digestive abnormalities like appetite suppression, indigestion, impaired capacity to repair ulcer, chronic dysfunction of intestines (irritable bowel syndrome); reproductive abnormalities such as erectile dysfunction, decrease of testosterone in men, irregular or absence of menstrual cycle in women and loss of libido in both men and women.<sup>51-54,57</sup> Progressive immune suppression that increases susceptibility to infectious diseases is also associated with WRS.<sup>51</sup>

### **3.1.2 Mental health issues**

WRS and mental health often go together.<sup>58</sup> WRS may trigger and worsen existing mental health problem that the employee could otherwise have effectively managed without letting his/her work affected.<sup>58</sup> Mental health issues could include mild symptoms such as difficulty in decision-making, poor memory, lack of concentration and persistent confusion, psychological disorders such as anxiety and depression.<sup>51,53,54,57</sup>

Mental health problems could include anxiety and depression with pessimistic thoughts and feelings; low self-esteem with feeling of worthlessness and loneliness; loss of inspiration and confidence; intense mood fluctuations with increased sense of irritation, tearfulness, sensitivity, aggression or defensiveness; changes in sleep pattern/eating habits; managing WRS with increased alcohol/smoking consumption and drug abuse; diminished performance which is sometimes seen as change in absenteeism/ presentism later arrival or unusual time off from the work; withdrawal (disengagement from work), violent and anxious behaviors.<sup>51-54,57,58</sup>

### **3.2 The effects of WRS on organization level**

If main leaders or majority of employees are affected, WRS decrease the healthiness and performance of an organization.<sup>52</sup> When organizational strategies are not well-built to protect their employees from WRS, workers' productivity may not be at their maximum and this may adversely affect the survival of the organization, in competitive market.<sup>52</sup> WRS may directly or indirectly affect the organizations by causing noticeable decrease in workers' productivity, efficiency, commitment to work, job contentment, client satisfaction, self-esteem and team cohesion.<sup>52</sup> WRS may also play a vital function in increasing rate of absenteeism, increasing unsafe working practices and work accident rates, increasing health care expenses and employee compensation claims, increasing employees' turnover with additional cost towards recruitment

and re-training, increasing conflicts, increasing in civility that affects work relationship with accusation of mobbing behavior, increasing accountability to legal allegation and proceeding applied by stressed workers.<sup>51,52,57</sup> These consequences of WRS decrease organization's reputation among its workers and to the outside world.<sup>55</sup>

#### **4. Magnitude of WRS**

Several studies assessed the magnitude of WRS in the European Union (EU) and European region countries. Fourth European Working Conditions Survey (EWCS-4) in 2005 stated that 22% of workers report stress as a work related health problem.<sup>59</sup> Workers of the new member states reported higher amount of stress at work compared to the EU older member states, about 32% and 20% respectively.<sup>60</sup> A study conducted in Estonia showed that number of employees who relate work with stress has risen to 32%, between the years 2001 and 2005.<sup>61</sup> Another study conducted in Germany by Work Council revealed that 79% of surveyed stated that there has been a rise in psychological strain between the year 2006 and 2008.<sup>62</sup> WRS has served to be the second most stressful situation for 39% of adults living in U.S. and balancing work and family is the fourth major stressor 24%.<sup>63</sup> Denmark Health Interview Survey (SUSY) showed that the percentage of employees experiencing severe degree of stress increased from 5.8% to 8.8% that from 1987 to 2005.<sup>64</sup>

Attitudes in the American Workplace VII conducted a survey that showed that 82% of workers experience at least some amount of stress.<sup>65</sup> According to the National Institute for Occupational Safety and Health (NIOSH), 40% of workers in U.S. reported that their job was very stressful for them.<sup>66</sup> America institute of stress states that, 60 – 80% of accidents in work are caused by disturbance in sleep and distractions caused due to work related stress.<sup>67</sup> Another study



conducted in Belgium found that around 29% of employees experiencing WRS, of which 10% are experiencing severe WRS.<sup>68</sup>

#### **4.1 Cost of burden**

WRS imposes significant burden on countries' economy and society. Journal of Occupational and Environmental Medicine states that in US health care expenditure is by 50% more for workers who report stress at job.<sup>66</sup> In 2000, the cost of job-related stress was assessed to fall within EUR 830 - 1,656 million in French working population affected by WRS.<sup>69</sup> In 2005-2006, the UK spent more than 530 million pounds towards WRS and its impacts.<sup>70</sup> In 2002, the European Commission assessed the yearly cost of WRS to be EUR 20,000 million in the UK.<sup>71</sup> In 2006, according to Occupational Injury Benefit (OIB) 1.7% of all claims are attributed to occupational stress.<sup>72</sup>

### **5. Rationale for investigation**

WRS is a prevalent public health problem among healthcare workers leading to the poor individual and organizational level outcomes. The WRS is well researched in European region and in other high income countries. However, very little data is available for low-middle income countries, including Armenia. The study aims to address this gap. The proposed study targets general practitioners (GPs) and general surgeons as these group of professionals might differ in levels of stress, as well as its sources, given the diversity of their working environments.<sup>73</sup>

Understanding of WRS risk factors among general practitioners and general surgeons practicing in Armenian hospitals in Yerevan could help to identify areas where improvements will be most useful. Thus, study findings could guide evidence based policy changes towards reducing stress in the hospitals working environment. This proposal will analyze risk factors that potentially

associated with work related stress among general practitioners and general surgeons working in Yerevan, Armenia.

## **6. Research question**

1. What are the independent risk factors associated with WRS among general practitioners and general surgeons working in Yerevan hospitals?
2. What is the difference in the level of WRS experienced among general practitioners and general surgeons working in Yerevan hospital?

## **7. Methods and Materials:**

### **7.1 Study design**

The study will utilize observational quantitative cross sectional design as more appropriate to address proposed research questions. This method is also reasonable for its resource-efficiency in terms of demanded time, finance and workforce.

### **7.2 Study population and setting**

The target population of the study is general surgeons and general practitioners (including family medicine and internal medicine physicians).<sup>74</sup>

*Inclusion criteria:* General practitioners and general surgeons working in Yerevan hospitals, with at least one year of working experience in the same hospital, who are fluent in Armenian and English languages.

*Exclusion criteria:* General practitioners and general surgeons who have been involved in any stress management program.

### **7.3 Data collection**

Unique ID numbers will be generated using the combination of the hospital number and the participants' sequential number. Our study instrument will be pretested to determine the time needed to complete a questionnaire and to adapt to the cultural context, if required. Our data collectors will then approach general practitioners and general surgeons with an envelope containing the study instrument and a consent form.

The completed questionnaire will be requested to return by the end of the day. Maximum attempt to collect a completed questionnaire will be three times, more than that the questionnaire will be counted as "No response".

#### **7.4 Sample size**

This study aims to identify the difference in the level of WRS among general practitioners and surgeons working in Yerevan hospitals. Thus, the sample size calculation is based on the need to detect the difference between these groups. To estimate the accurate proportion, the following considerations from the literature were taken into account.

According to a study done among physicians in Jordan, 33% of general practitioners have WRS.<sup>75</sup> Thus, for general practitioners we consider this proportion for the sample size calculation. In some studies, surgeons reported to have WRS and burnout ranging from 44% to 48%<sup>76</sup>; in South Korea WRS was reported by 47% of surgeons.<sup>77</sup> A study done by Linzer et al also reveals that WRS rate ranges from 30% to 65% across specialties with primary care physicians and emergency medicine at frontline.<sup>78</sup> For surgeons we took an average of the proportions identified in the literature described above, which is 0.49.

We used two sample comparison of proportion formula to calculate the required sample size:

$$n = \frac{z_{1-\frac{\alpha}{2}}^2 [p_1(1-p_1)+p_2(1-p_2)]}{d^2}$$

The calculation was done manually and later confirmed using STATA software. In STATA we set up  $\alpha$  (0.05) and power (0.95) and corrected for continuity.<sup>79</sup> The design effect was 1.2. The final sample size is 612 -  $n_1$  (306) and  $n_2$  (306)

### **7.5 Sampling strategy**

The sampling strategy will be probability proportional to size (PPS),<sup>80</sup> where hospitals will serve as primary sampling units. This sampling technique has two main components: first, selection of clusters during which larger hospitals have higher probability to be selected and, second, sampling of same number of individuals for each cluster. During this second stage physicians in bigger clusters will have less probability to be selected. As a result of this two-stage sampling each individual of the target population will have equal opportunity to be selected.

There are 53 hospitals in Yerevan.<sup>81</sup> Student investigator will contact hospitals administration to receive permission to access the employees' list and further conduct the data collection in the hospitals. The number of general practitioners and general surgeons will be obtained from each hospital, the information obtained will be documented in excel sheet, sampling procedures described below will be applied for both groups. The number of clusters will be 15 and the cluster size will be the same for each cluster – 40 physicians (20 general surgeons and 20 general practitioners).

Consecutive numbers will be assigned to all 53 hospitals (primary sampling units). The total number of target population in each hospital separately, as well as the cumulative sum of it will be calculated. To get a sampling interval (SI) we will divide the total number of target

population by number of clusters (15). Then we will select a random starting point (P) between 1 and SI. We will select the hospital as our cluster if cumulative sum of the target population in it will have our random number. Same will be done for selecting the remaining clusters through generating series of numbers (P, P+SI, P+2SI...., P+14SI).

Within each selected cluster, each participant will be selected by simple random sampling method. The general practitioners and general surgeons will be invited to participate in our study. In case of refusal, the immediate next person in the list will be contacted.

## **7.6 Study variables**

The dependent variable (outcome) for this study is the presence or absence of WRS (dichotomous variable). The main independent (explanatory) variables are physician specialization, work demand, work control, managerial support, work colleague support, job role, relationship and change. The covariates are; age gender, family status, socio-economic status, work shifts, life satisfaction, job satisfaction, chronic illness, self-related health, depression and hours of work. Table 1 presents the variables and their types.

## **7.7 Study instrument**

The study will use the instruments describe below.

Health and Safety executive (HSE)<sup>82</sup> questionnaire is designed to measure WRS risk factors and give opportunity to assess whether an employee have or does not have a WRS. The HSE questionnaire is shown to be valid and reliable for studying work stress and has been widely used in assessments of risk factors of WRS.<sup>82-84</sup> HSE is a 35 item questionnaire that contains seven domains of major risk factors associated with work related stress: “demand, control, managerial support, work colleague support, role, relationship and change.” Response option for the HSE

questionnaire are presented in a 5-point Likert scale from “never”, to “always” and from “strongly agree”, to “strongly disagree”. Each question is scored from 1 – 5. Each domain has a collective set of questions that define the domain as a whole. Cumulative scores are calculated and analyzed using an analysis tool provided by the HSE. Along with the HSE questionnaire, we compiled set of questions which will be used to gain information regarding other variables of interest. These questions have been used in surveys conducted in Armenia. The main sections of the questionnaire include demographics, job satisfaction, life satisfaction, self-related health, depression, chronic illness, as well questions regarding work duration, and participation in any stress management program. A single item measure will be used to measure the level of experienced WRS. The question was adapted from APA (2011)<sup>26</sup> and has been used in a study to measure general work stress.<sup>85</sup> This will be categorized into dichotomous variable of having and not having WRS.

Completion time for the questionnaire will be estimated by pretesting. All the questions will be translated from English to Armenian. This questionnaire will be pretested and changes will be made accordingly. Study instrument is a self-administered questionnaire.

## **7.8 Data management and analysis**

After collecting the data, a statistical software SPSS will be used for double data entry and analysis. After double data entry the databases will be merged, identified errors will be cleaned. Descriptive statistics will be done to describe the study population. Means, standard deviations will be calculated for continues variables, medians, proportions and frequencies for ordinal categorical variables.

Since the outcome variable is dichotomous we will use logistic regression. Simple logistic regression will be used to determine the association of WRS with all independent variables. All

variables that will show significance level of 0.25 will be included in the multivariable logistic regression modeling. Those independent variables that will influence the association between WRS and other independent variables will be identified as possible confounders and will be tested additionally. Testing for the confounders will be done through checking whether any of the independent variables are associated with the other independent variables.

With the help of Variance inflation factor (VIF) multi-collinearity will be checked and the variables with high correlation will not be included together in the final model. Hosmer – Lemeshow goodness of fit test will be used to come up with the final model that best fits the data.

In order to identify difference between level of WRS among general practitioners and general surgeons we will run Pearson's chi-square test to identify differences in proportions of WRS variables between general practitioners and general surgeons.

## **8. Ethical considerations**

The study protocols comply with requirements of Institutional Review Board of American University of Armenia. Oral consent will be obtained from each perspective participant before the enrollment to the study (Appendix 2).

## **9. Resources**

### **9.1 Budget**

The budget is calculated based on the estimated operational and administrative expenses. The majority of funds will be directed towards operational expenses that include salary of the personnel. Salary calculations are based on the estimates of local market for similar positions. The project coordinator and statistician will receive a salary on monthly basis, the data entrée

specialists and interviewers per completed data entry and completed interview respectively. The estimated budget for the operational expenses is 1,439,600 AMD. Administrative expenses include office rent, office maintenance, travel costs and communication costs. An estimate of 1,866,400 AMD is needed to meet the administrative expense of this research. In total a sum of 3,306,000 AMD is required to conduct the proposed research. Comprehensive information on fund allocations is presented in Table 2.

## **9.2 Personnel**

The personnel of the proposed project will include a project coordinator, data collectors, data entry specialists and a statistician. The project coordinator will administrate the research process. The project coordinator will be responsible for identifying study population, training of the data entry specialists, assuring quality control of fieldwork, data cleaning and merging, as well as contributing to the data analysis. The project coordinator will be responsible for preparing the final report to a donor organization. Five data collectors will be trained to conduct the data collection: approach prospective study participants, acquire oral consent and administer the questionnaire. Two data entry officers will then enter the data into SPSS software (version 16.0), after which the databases will be merged and cleaned. The statistician and project coordinator will run the data analysis. The activity schedule of the proposed project is described in details in Table 3.



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## Tables

**Table 1: Table of variables**

<b>Dependent Variables</b>	
Presence or absence of WRS	Dichotomous
<b>Independent Variables</b>	
Physician specialization	Dichotomous
Work demand	Continuous
Work control	Continuous
Managerial support	Continuous
Work colleague support	Continuous
Job role	Continuous
Relationship	Continuous
Change	Continuous
<b>Covariates</b>	
Age	Continuous
Gender	Dichotomous
Marital status	Nominal
Socio-economic status	Ordinal
Work duration	Ordinal
Job satisfaction	Ordinal
Life satisfaction	Ordinal



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Chronic illness	Nominal
Self-related health	Ordinal
Depression	Ordinal
Work shift	Nominal
Hours of work	Continuous

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**Table 2: Budget of the project**

<b>Cost type</b>	<b>Type of payment</b>	<b>Number of units</b>	<b>Amount per unit (AMD)</b>	<b>Total</b>
<b><i>Operational (Personnel):</i></b>				
Project coordinator (x1)	Fixed Monthly	4 (month)	200,000	800,000
Data collectors (x 5)	Per complete interview	612 (unit)	400	244,800
Data enterer (x 2)	Fixed per hour	612 (unit)	400	244,800
Statistician (x 1)	Fixed monthly	1 (work)	150,000	150,000
			<b>Subtotal</b>	<b>1,439,600</b>
<b><i>Administrative:</i></b>				
Office renting		4 (month)	100,000	400,000
Photocopying		612 (unit)	200	122,400
Electricity, Heating, Water		4(month)	20,000	80,000
Stationary/Office supplies		1 (total)	40,000	40,000
Travel Cost		612 (unit)	2000	1,224,000
			<b>Subtotal</b>	<b>1,866,400</b>
<b>GRAND TOTAL: 3,306,000 AMD</b>				

**Table 3: Activity schedule**

## Program Implementation

	Month I		Month II		Month III		Month IV	
	1-15	16-30	1-15	16-31	1-15	16-30	1-15	16-31
IRB Notification	<b>X</b>							
Permission from Ministry of health	<b>X</b>							
Sample frame production	<b>X</b>	<b>X</b>	<b>X</b>					
Questionnaires preparation		<b>X</b>						
Training interviewers			<b>X</b>	<b>X</b>				
Data collection				<b>X</b>	<b>X</b>	<b>X</b>		
Data entry training			<b>X</b>	<b>X</b>				
Data entry, double data entry and data cleaning				<b>X</b>	<b>X</b>	<b>X</b>		
Data analysis						<b>X</b>	<b>X</b>	<b>X</b>
Report preparation								<b>X</b>

## Appendices

### Appendix 1. Questionnaire

*Read the questions carefully and check the appropriate box.*

1. Date of birth (day/month/year) \_\_\_\_/\_\_\_\_/\_\_\_\_

2. Your age in years at the last birthday \_\_\_\_\_

3. Gender

1. Male

2. Female

4. Marital status

1. Single

2. Married

3. Divorced

4. Widowed

99. I refuse to answer

5. How do you rate your social status?

1. Substantially below average

2. Little below average

3. Average

4. Little above average

- 5. Substantially above average
- 99. Not sure/difficult to response

6. In an average how much is your monthly income?

- 1. Less than 50 000 drams
- 2. 50 000 – 100 000 drams
- 3. 101 000 – 200 000 drams
- 4. 201 000 – 300 000 drams
- 5. More than 301 000 drams
- 99. I don't know/ I refuse to answer

7. Last month, the approximate amount of household income spent by all of your household members was:

- 1. Less than 25,000 drams
- 2. From 25,000 - 50,000 drams
- 3. From 51,000 - 100,000 drams
- 4. From 101,000 - 250,000 drams
- 5. Above 250,000 drams
- 99. Don't know/ Don't want to answer

8. Check the box that best corresponds to your current work situation? (Mention all that apply)

- 1. Full-time
- 2. Part-time
- 3. Day shift
- 4. Night shift
- 5. Other (Specify) \_\_\_\_\_

9. How many hours do you work per day? \_\_\_\_\_

10. How long have you been working in this hospital as a general physician/ general surgeon? \_\_\_\_\_

11. Have you participated (participating) in any stress management programs in the past one year? \_\_\_\_\_(Yes/ No)

12. What is your average daily level of stress from work?

**Where:** 1 means little or no stress and 10 means a great deal of stress.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
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13. Job Satisfaction <sup>88</sup>

No.	Question items	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree
		1	2	3	4	5
1	Overall I am satisfied with my job.	1	2	3	4	5
2	This job measures up to the goals I had in mind for	1	2	3	4	5

	myself when looking for employment.					
3	I would say that I enjoy the work I do here.	1	2	3	4	5
4	My satisfaction with my job here is sufficient that I have no immediate plans to look for another job elsewhere.	1	2	3	4	5
5	Overall, I am satisfied with the salary associated with my job.	1	2	3	4	5
6	Overall, I am satisfied with the benefit package associated with my job.	1	2	3	4	5

14. Please, indicate, how satisfied are you with:

		<b>Extremely dissatisfied</b>	<b>Dis- satisfied</b>	<b>Neither satisfied nor dissatisfied</b>	<b>Satisfied</b>	<b>Very Satisfied</b>
1.	The health of your body?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
2.	Your ability to think?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

		<b>Extremely dissatisfied</b>	<b>Dis- satisfied</b>	<b>Neither satisfied nor dissatisfied</b>	<b>Satisfied</b>	<b>Very Satisfied</b>
3.	Your sexual activity?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
4.	How much you see your family or friends?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
5.	The help you get from family or friends?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
6.	Your daily activities?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
7.	Your recreational or leisure time activities?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
8.	Your household income meeting your needs?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
9.	Your ability to help in your community?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

15. Please indicate any chronic health problem(s) that you presently have. (*Mention all that apply*)

1. Diabetes



- 2. High blood pressure
- 3. Heart disease
- 4. Lung disease (including asthma)
- 5. Stomach /intestine disease
- 6. Cancer
- 7. Eye/vision problems
- 8. Kidney problems
- 9. Problems with joints/bones
- 10. Other problems (*describe*) \_\_\_\_\_
- 11. No chronic health problems

16. How would you describe your health in the last 30 days?

- 1. Excellent
- 2. Very good
- 3. Good
- 4. Fair
- 5. Poor

17. How would you rate your overall health now compared to one year ago?

- 1. Much better

- 2. A little better
- 3. About the same
- 4. A little worse
- 5. Much worse

18. Please, indicate, how much bodily pain have you had during the last 30 days?

- 1. None
- 2. Very mild
- 3. Mild
- 4. Moderate
- 5. Severe
- 6. Very severe

19. The following items are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

<u>ACTIVITIES</u>	<b>Yes, Limited A Lot</b>	<b>Yes, Limited A Little</b>	<b>No, Not Limited At All</b>
a. Bathing or dressing yourself	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
b. Walking <b>one block</b>	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
c. Walking <b>several blocks</b>	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
d. Walking <b>more than a mile</b>	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
e. Bending, kneeling, or stooping	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
f. Climbing <b>one</b> flight of stairs	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
g. Climbing <b>several</b> flights of stairs	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
h. Lifting or carrying groceries	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
i. <b>Moderate activities</b> , such as moving a table, pushing a vacuum cleaner	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3
j. <b>Vigorous activities</b> , such as running, lifting heavy objects, participating in strenuous sports	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3

20. Below are some statements. Using the following scale, please describe how you felt during the **past seven days**: how often have you felt like each of these?

*Please, answer, all the questions.*

	<b>Rarely or none of the time (&lt;1 day)</b>	<b>Some of the time(1-2 days)</b>	<b>Moderate amount of time (3-4 days)</b>	<b>All of the time (5-7 days)</b>
1. I was bothered by things that usually don't bother me.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
2. I did not feel like eating; my appetite was poor.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
3. I felt that I could not shake off the blues even with help from my family or friends.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
4. I felt that I was just as good as other people.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
5. I had trouble keeping my mind on what I was doing.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
6. I felt depressed.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
7. I felt that everything I did was an effort.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
8. I felt hopeful about the future.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
9. I thought my life had been a failure.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
10. I felt fearful.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

	<b>Rarely or none of the time (&lt;1 day)</b>	<b>Some of the time(1-2 days)</b>	<b>Moderate amount of time (3-4 days)</b>	<b>All of the time (5-7 days)</b>
11. My sleep was restless.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
12. I was happy.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
13. I talked less than usual.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
14. I felt lonely.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
15. People were unfriendly.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
16. I enjoyed life.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
17. I had crying spells.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
18. I felt sad.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
19. I felt that people disliked me.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4
20. I could not get "going".	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4

### HSE questionnaire in English.

<b>No.</b>	<b>Question items</b>	<b>Never</b>	<b>Seldom</b>	<b>Sometimes</b>	<b>Often</b>	<b>Always</b>
1	I am clear what is expected of me at work					
2	I can decide when to take a break					
3	Different groups at work demand things from me that are hard to combine					
4	I know how to go about getting my job done					

5	I am subject to personal harassment in the form of unkind words or behavior					
6	I have unachievable deadlines					
7	If work gets difficult, my colleagues will help me					
8	I am given supportive feedback on the work I do					
9	I have to work very intensively					
10	I have a say in my own work speed					
11	I am clear what my duties and responsibilities are					
12	I have to neglect some tasks because I have too much to do					
13	I am clear about the goals and objectives for my department					
14	There is friction or anger between colleagues					
15	I have a choice in deciding how I do my work					
16	I am unable to take sufficient breaks					
17	I understand how my work fits into the overall aim of the organization					
18	I am pressured to work long hours					
19	I have a choice in deciding what I do at work					
20	I have to work very fast					
21	I am subject to bullying at work					
22	I have unrealistic time pressures					
23	I can rely on my line manager to help me out with a work problem					

		<b>Strongly disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly agree</b>
24	I get help and support I need from colleagues					
25	I have some say over the way I work					
26	I have sufficient opportunities to question managers about change at work					
27	I receive the respect at work I deserve from my colleagues					
28	Staff are always consulted about change at work					
29	I can talk to my line manager about something that has upset or annoyed me about work					
30	My working time can be flexible					
31	My colleagues are willing to listen to my work-related problems					
32	When changes are made at work, I am clear how they will work out in practice					
33	I am supported through emotionally demanding work					
34	Relationships at work are strained					
35	My line manager encourages me at work					

## **Appendix 2. Consent form (English)**

### **American University of Armenia**

#### **Institutional Review Board #1**

#### **Consent form (English)**

Hello, I am **Danie Franklin**. I am a graduate student in the **Gerald and Patricia Turpanjian School of Public Health at the American University of Armenia (AUA)**. I am conducting a research study under the supervision of two faculty members. The main aim of the study is to assess the risk factors associated with work related stress. As you are a General physician/ General surgeon you are invited to participate in this study. You along with 509 other general practitioners and general surgeons are invited to participate in this study in order to expand the understanding of Work related stress perceived and experienced by physicians in Yerevan Armenia. This is a self-administered questionnaire. I will ask you to fill in a questionnaire and it will take you approximately - 25 minutes -<sup>2</sup> to complete this survey. You are free to skip, refuse to answer or withdraw from the interview at any point. There are no penalties or consequences of any kind if you decide that you do not want to participate. Questions will be related to work demand, work control, managerial support, working colleague support, job role, relationship at work and change at work; you have experienced as a general physician/general surgeon. There is no right or wrong answers so feel free to share your opinion. While you may not directly benefit from this research, your participation will help us to have an understanding about work related stress faced day to day among general physicians/general surgeon. This may help us to recommend strategies and have an impact in reducing work related stress among doctors. There

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<sup>2</sup> The time will be correctly determined after pretesting



are no costs or compensations for your participation. We will protect the confidentiality of your data. After the data collection I will destroy the list of participants with identifiable information including names and addresses. Your name, address or any other identifiable information will not appear on the questionnaire and in the study findings.

Only general findings will be presented in the final report. This is a onetime survey and you will not be contacted in the future. At the conclusion of this study, the findings may be published.

If you want to contact someone to voice concerns or complaints about the research, you may contact to the primary investigator of this study, Dr. Kristina Akopyan at the School of Public Health, American University of Armenia, phone: 060 61 2516 who will be available to discuss this study with you long into the future. If you would like to discuss your rights as a research participant, discuss problems, concerns or if you come to believe that you have not been treated fairly during this study you may contact the Human Protections Administrator of the American University of Armenia, Ms. Varduhi Hayrumyan (37460) 61 26 17.

Do you agree to participate? Please say YES or NO. If yes, shall we start?