

# Health Related Quality of Life among Engineering Professionals-Pilot Study

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**Abstract**—The present study tends to ascertain Health-Related Quality of Life (HRQoL) of engineering professionals who are sometimes exposed to unhygienic and deleterious conditions. To study health related conditions of engineering is as important as those of other professionals. However, a very limited empirical data in this regard are available which call for serious concern to carry on the present research. (HRQoL) is a multidimensional concept, not narrowed to mere physical well-being but expanded to mental, social and psychological aspects of professionals working in different domains. The study is drawn on a quantitative survey based on 223 respondents working on site or in an office environment, with a mean age of  $37 \pm 9$  years and  $13 \pm 8$  years of experiences in engineering fields. The SF-8 Health self-administered survey was used in this study to assess the HRQoL of engineering professionals which was found overall in good shape. Hence, the study concluded that engineering professionals have a high HRQoL. One of the limitations of this study is the small sample size.

**Keywords**—Engineering Professionals, Quality of Life, Workplace and Engineers

## I. INTRODUCTION

Health related quality of life (HRQoL) has been documented for different professions such as teachers, nurses, dentists, etc [1], [2], [3], [4]. It is surprising that HRQoL for engineering professional has not been reported. Therefore, this study was designed to determine the HRQoL for engineering professionals. Working in an Engineering profession is demanding regardless of the nature of work involved, which can be at the office, in the field or a combination of both. Engineering professionals working in the field can be exposed to harsh conditions such as extreme weather, chemicals, high level of noise from equipment, working in remote locations and other conditions. Engineering professionals working in the office can experience long working hours, and stressful situations. These working conditions require monitoring and investigating their quality of life.

Quality of Life (QoL) of engineering professionals focuses on healthy lifestyle. QoL centered mainly on the physical, psychological aspects of an individual [5]. According to the World Health Organization (WHO), the concept of the quality

of life differs from person to person. It is the culture and the value systems that an individual lives with, determine his unique perception of QoL. In addition, his goals, expectations, standards, and unique concerns that emerged from his socio-cultural life, equally impact his worldviews about the quality of life. Comprehensively, all elements such as psychological and physical health, social relationships, personal beliefs, independence, and their relationship to salient features of their environment go a long way in shaping an individual's perception of QoL [6], [7]. In fact, Health-related quality of life (HRQoL) and Quality of Life (QoL) in general are intertwined which affect each other a great deal. This is further confirmed by the Centers for Disease Control and Prevention (CDCP) which illustrates how a person's physical, mental, social and emotional functioning get affected by his meager health [8]. Public health studies have inferred that there is a need to improve HRQoL among all individuals. Limitations in physical functioning are considered poor HRQoL [9]. The new trends in workplaces and changing environment and technologies may result in adverse HRQoL [10], [11]. Health-related quality of life (HRQoL) is a self-perceived multi-dimensional tool that quantifies the health of a person from different aspects including psychological, physical, and social functioning [2]. Quantifying the HRQoL has gained more interest among occupational professionals [12].

Engineering profession is a challenging job that requires competence, skills, abilities and profound concentration. Engineers need to be very good at visual acuity, auditory perception, and intellectual acumen. In addition, engineers must have the ability to work in extreme outdoor conditions. Their performance and productivity are most likely to decline if they lack any of the above-mentioned qualities. There is no doubt that firm safety standards, numerous advances in the technology and tools used by engineering professionals could improve the health conditions of Engineers. However, the author hasn't come across any previous experimental studies which have thoroughly investigated HRQoL with respect to engineering profession in Saudi Arabia. With a view to realizing the significance of HRQoL in engineering profession, the present study was carried out to ascertain the true picture of engineers' HRQoL in Saudi Arabia.

## II. METHODOLOGY AND STUDY MATERIAL

This study is conducted on two hundred and twenty three individuals who are working in the engineering profession. Their years of experience range from less than 11 years to 30

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years. The group age ranges from 20 years to over 40 years. The study covers engineering professionals who have either graduate or undergraduate academic qualifications. The sample included individuals working on site or/and working in an office environment. The study is based on a four-month cross-sectional quantitative survey which began from August 2017 to October 2017 and the data were collected by using structured questionnaire Short Form-8 (SF-8) [13]. The respondents working in the major companies in Saudi Arabia were targeted such as Aramco, Sabic, Saudi Electricity Company, and Simens. Out of 250 questionnaires, only 223 questionnaires were used for an effective response rate of 89% and 27 questionnaires were omitted due to lack of complete data sample. The present study has also used such structured questionnaires that are comprised of basic personal profile including age, education qualification, location of work and years of experience in engineering fields along with the SF-8 Health Survey Questionnaire.

The SF-8 Health Survey has eight questions to determine a HRQoL profile. This survey contains practical advantages because it is brief compared to the SF-12 and SF-36 which composed of twelve and thirty six questions respectively. Moreover, the SF-8 yields scores that are as accurate as the SF-12 and SF-36 questionnaires. The physical component summary (PCS) and mental component summary (MCS), comparable among the surveys and higher scores indicate better HRQoL. The reliability of the SF-8 survey has been examined in previous studies and found valid and responsive to changes. This is a very useful feature to evaluate the variations in HRQoL over time [13].

The SF-8 has been developed and validated in different versions for three recall periods: standard (4- week), acute (1-week), and acute (24-hours). In the presented study, a 4-week recall has being used to measure the HRQoL among engineering professionals. The SF-8 represents eight dimensional concepts i.e. physical functioning (PF), role limitation caused by physical problems (RP), bodily pain (BP), general health (GH), vitality (VT), role limitation because of emotional problems (RE), social functioning (SF), and mental health (MH) [13]. This study presented in this paper has utilized an online scoring tool on the website <http://www.qualitymetric.com>. The scores of the eight dimensional concepts mentioned above along with the PCS and the MCS are scaled from worst (0) to best (100). The higher the score the better the HRQoL and vice versa [14].

### III. DISCUSSIONS

Fig. 1 shows that the majority of the population is generally in a good or very good health regardless of their years of experience. This could imply that the nature of the profession has no noticeable health related problems. It is interesting to note that none of those who worked for over 20 years suffers from poor health conditions. Most of the population regardless of their nature of their workplace is in a good or very good health. With respect to the age of the participants, most of the population is in a good or very good health. The

same trend still applies with respect to the educational level. Most of the population in this case is in a good or very good health conditions. Figure 2 points out that the physical health problems of the majority of the population have a very little, if any, impact on their physical activities. This happens because of the dynamic nature of the engineering profession associated with physical and dynamic activities with frequent body movements, going up/down the stairs, moving around the site. This keeps them physically healthy.

It can be seen from Fig. 3 that the majority of the population had very little or not at all experienced any difficulty doing their daily work. Similarly, Fig. 4 shows that the majority of the populations have very mild pain and only few of them have severe pain. Fig. 5 shows that the majority of the engineers have quite a lot or some energy. Due to the active work environment resulted in energetic individuals. Fig. 6 shows that the majority of the population ranges between very little and somewhat. It seems that the active performance and the irregular daily activities have positive impact on the social activities for the majorities of engineers. Fig. 7 shows that due to the responsibilities and sensitive work environment and the demanding technical duties only few of the participants did not experience any emotional problems. However, these emotional or personal problems of the majority of the population had a very little, if any, impact on their daily activities as shown in Fig. 8.

Table 1 shows the mean score for the population under study. It can be observed from Table 1 that the HRQoL, especially PCS and MCS with a mean and a standard deviation of  $49 \pm 8$ ;  $44 \pm 10$  respectively whereas the subscales scores range from 44 to 51. The empirical studies indicate that if the score is higher, the HRQoL and similarly are found higher. Similarly the HRQoL is found lower if the score is lower. Moreover, some studies also explored that HRQoL reaches high scale if a total score of 50 or more is obtained [15]. Relying on the aforesaid observation, the present study might infer relatively similar findings with regard to HRQoL among engineering professionals. Moreover, it seems that the physical health component is better than the mental health component for engineers. It seems that due to the dynamic nature of the engineering profession associated with physical and dynamic activities with frequent body movements, going up/down the stairs, moving around the site. Moreover, the safety measures in the site and the well-designed working environment can contribute to a high physical health component.

Table 1 shows that Engineers who works in the office have a slightly better mental and physical HRQoL than those who works in the field. This is probably due to the fact filed engineers are exposed to different weather conditions which some time extreme such as very high temperatures, humidity, pressure.

Table 1 shows that young engineers has slightly higher physical and mental health conditions. Young engineers probably do not have major positions, which mean they have less responsibility and less things to worry about.

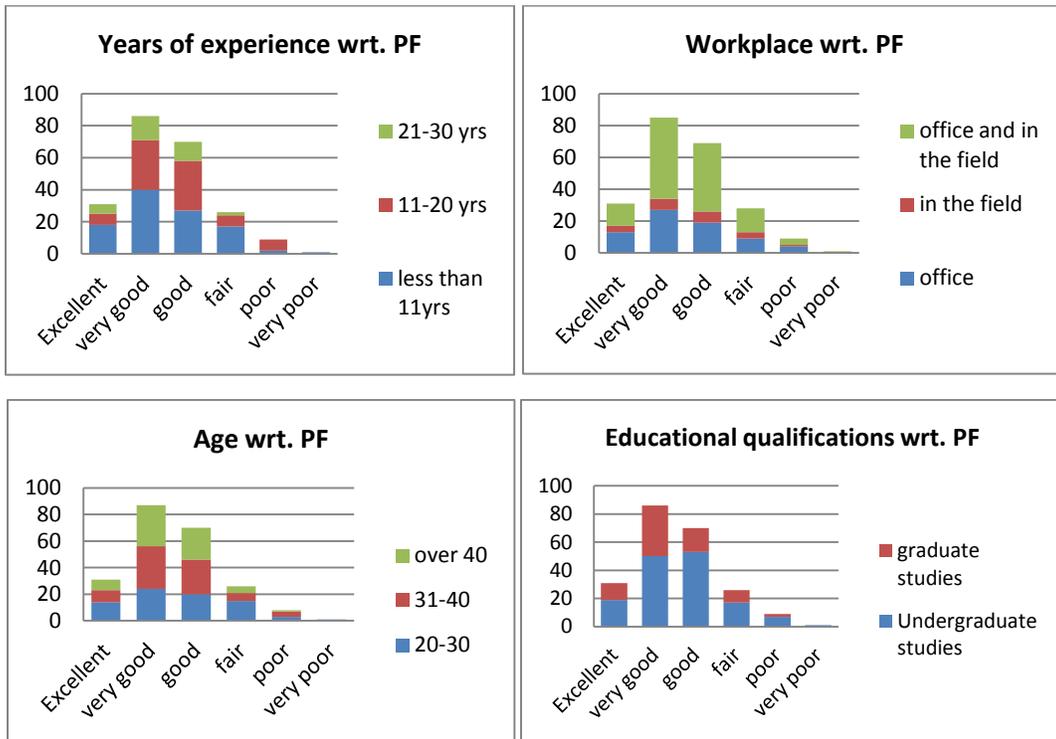


Fig. 1: population response with respect to the physical functioning (PF)

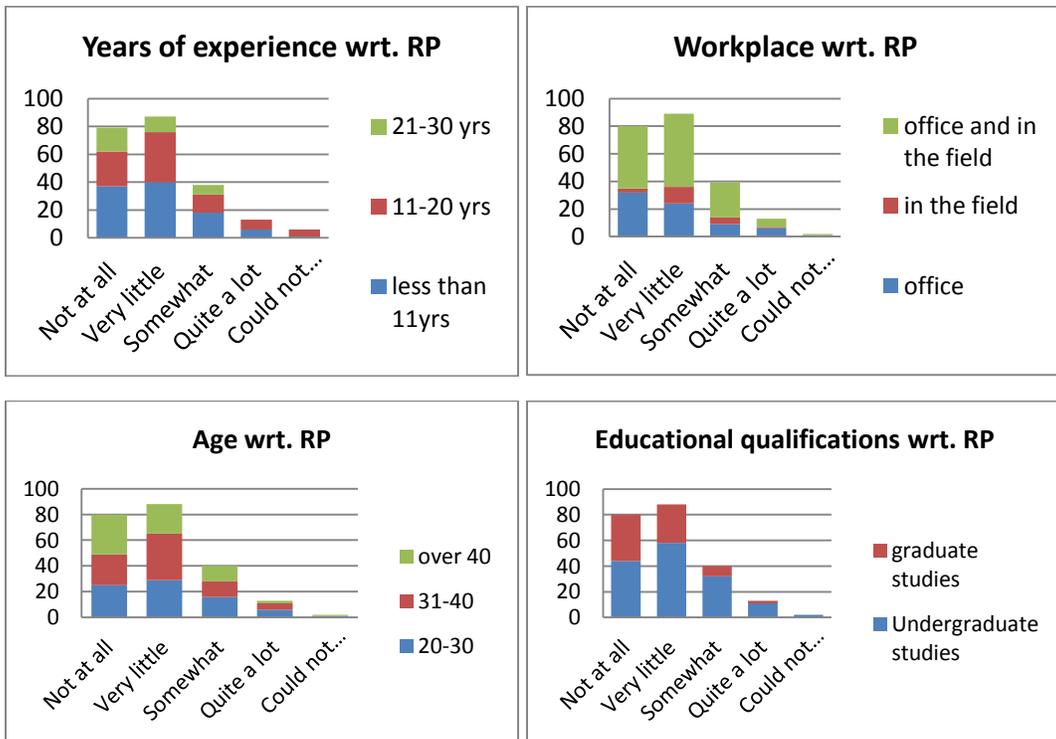


Fig. 2: population response with respect to the role limitation caused by physical problems (RP)



Fig. 3: population response with respect to bodily pain (BP)

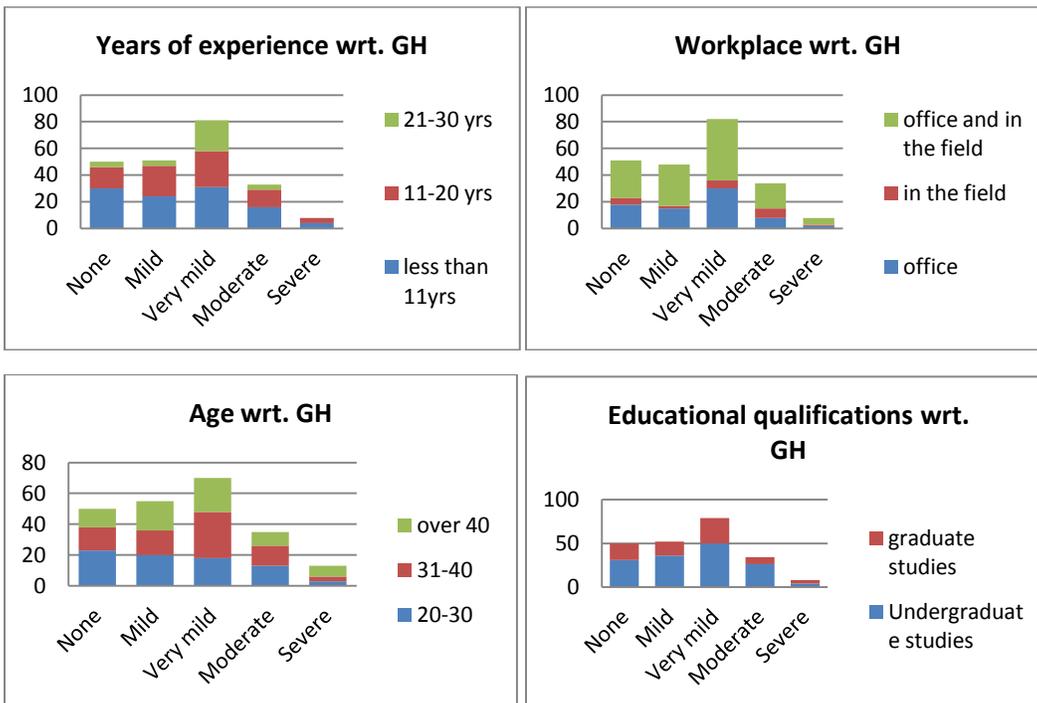


Fig. 4: population response with respect to general health (GH)

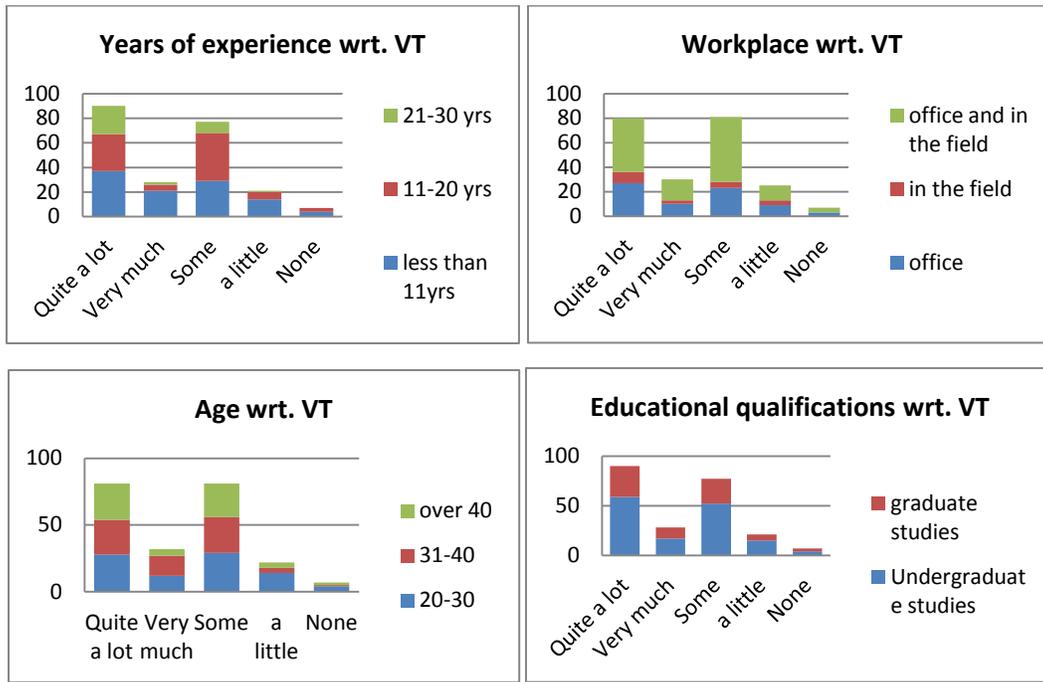


Fig. 5: population response with respect to vitality (VT)

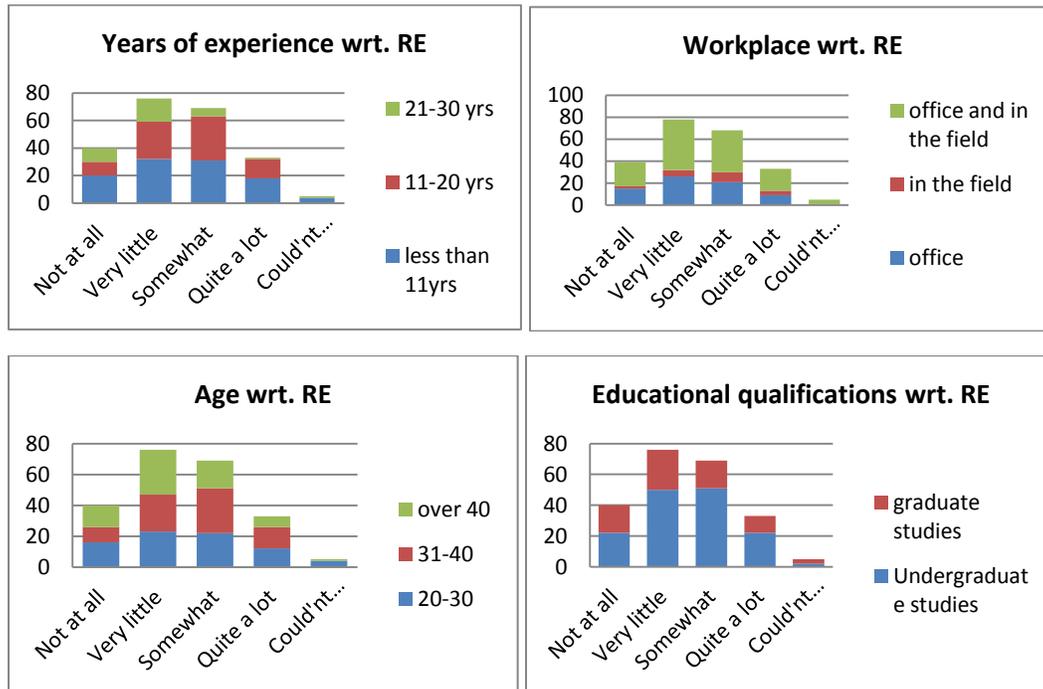


Fig. 6: population response with respect to the role limitation because of emotional problems (RE)



Fig. 7: population response with respect to social functioning (SF)

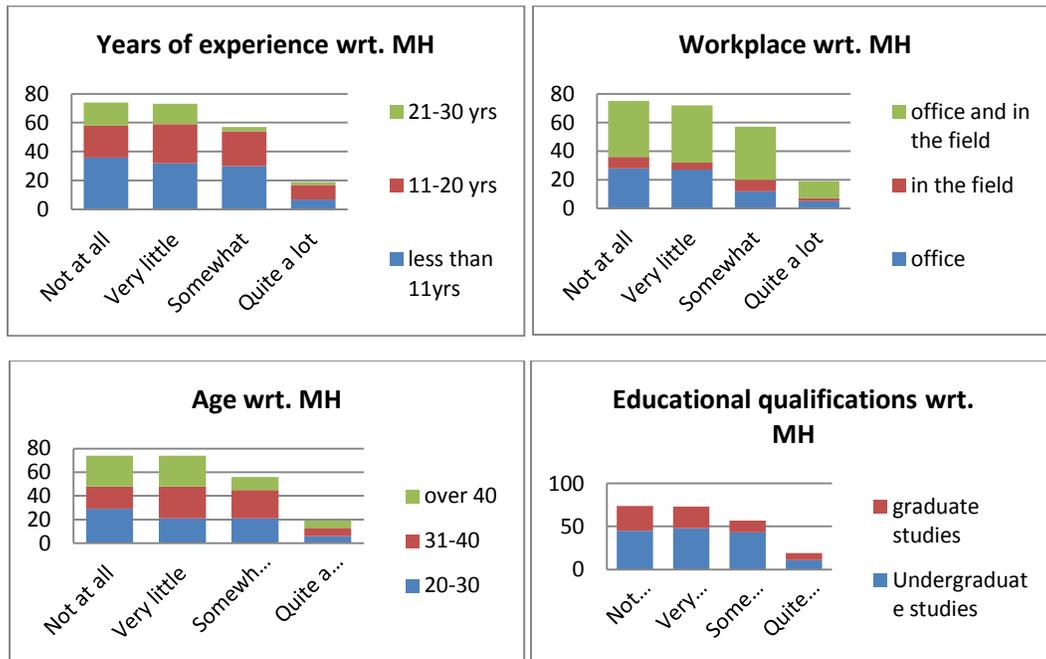


Fig. 8: population response with respect to mental health (MH)

Table 1: Summary of scores

		PF	RP	BP	GH	VT	SF	RE	MH	PCS	MCS
	<b>Total mean</b>	48	46	51	49	50	44	45	44	49	44
Work place	in the field	46	45	50	48	49	43	44	44	48	44
	office	49	47	52	50	51	45	45	45	50	45
	both	48	46	51	49	50	44	44	44	49	44
Years of experience	less than 11	48	46	51	49	50	44	45	44	50	45
	11-20	48	46	51	49	50	44	45	44	49	44
	21-30	48	46	51	49	50	44	44	44	49	44
Age	20-30	48	46	51	49	50	44	45	44	50	45
	31-40	48	46	51	49	50	44	44	44	49	44
	over 40	48	46	51	49	50	44	45	44	49	45
Educational level	undergrad	48	46	51	49	50	44	45	44	49	45
	grad	48	46	51	49	50	44	44	44	49	44

It is worth mentioning that the respondents who participated in this study have inherent aptitude for engineering profession. Besides, engineering profession is preferably chosen due to various reasons: such as fabulous salary package, social acceptance, career counselor's advisor and professional/ academic lifestyle. All these factors are responsible for immense motivation for engineering professionals. In fact, engineering profession has an edge over other professions because it provides lucrative job opportunities, professional status and job security. These positive factors yield remarkable HRQoL among engineering professionals.

#### IV. CONCLUSION

Based on the above findings, the result of the presented study reflects a relatively high HRQoL among engineers. Moreover, it seems that the physical health component is better than the mental health component for engineers. It seems that due to the dynamic nature of the engineering profession associated with physical and dynamic activities with frequent body movements, going up/down the stairs, moving around the site. Moreover, the safety measures in the site and the well-designed working environment can contribute to a high physical health component. Engineers who work in the office have a slightly better mental and physical HRQoL than those who work in the field. This is probably due to the fact that field engineers are exposed to different weather conditions which some time extreme such as very high temperatures, humidity, pressure. Young engineers have slightly higher physical and mental health conditions. Young engineers probably do not have major positions, which mean they have fewer responsibilities and less things to worry about. Hence, we think that job satisfaction factor lucrative salary package, career opportunities, professional status, job

security may cause the observed high HRQoL among the study subjects.

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