Original Article

The Health-Related Quality of Life of Junior Doctors

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Abstract

Introduction: It is reported that junior doctors experience a large amount of work-related stress and fatigue which has detrimental effects on their well-being and patient safety. We seek to determine the health-related quality of life (HR-QoL) of junior doctors using the Short Form 36 Health Survey (SF-36) and compare their HR-QoL with that of populations of norms and senior doctors. Materials and Methods: The SF-36v2 (Singapore version) was self-administered to a convenience sample of 213 doctors from a large tertiary teaching hospital. Junior doctors were defined as those less than 30 years of age (48%). Adjusted normative values were derived from the SF-36 Norms for the Singapore General Population Calculator for all 8 scales. The mean score differences between junior doctors and their adjusted normative values as well as that for senior doctors were computed and contrasted. Results: One hundred and eighty-five doctors fully responded. Their mean age was 33.6 years (SD 8.1). Also, 45% were female and 88% were Chinese. Junior doctors had lower scores than senior doctors in all scales except Physical Functioning. After adjustment for gender and race, junior doctors had statistically significant lower Mental Health scores than senior doctors (P = 0.01). Compared with the normative population, junior doctors scored lower in all domains except for Physical Functioning. For Vitality, the difference is – 14.9. Conclusion: Junior doctors have poorer mental health scores compared to senior doctors. Also, the lower vitality scores suggest that junior doctors are more likely to be fatigued than their normative population. More studies and efforts will be needed to identify factors that affect the quality of life in junior doctors and to evaluate the most appropriate measures to improve the efficiency of their work.

Ann Acad Med Singapore 2012;444-50

Key words: Mental health, Quality of life, Young doctors

Introduction

It is widely reported that junior doctors experience a large amount of work-related stress[1] and fatigue.[2] This has detrimental effects both on the well-being of the junior physicians[3] and the health and well-being of the patients that they are treating.[4,5] Junior doctors, especially those undergoing traineeship, have shown high degrees of burnout and psychiatric morbidity, attributable to the high level of stress they experienced.[6] Junior doctors have reported low job satisfaction,[7] increased absenteeism,[8] impaired family life,[9] increased alcoholism[10] and even increased risk of traffic accidents.[11] Other serious psychiatric consequences that have been reported among junior doctors include depression[12] and obsessive-compulsive behaviour.[13]

While there have been many studies on the plight of junior doctors, many of them specifically focus on burnout, or at the most, mental health, using instruments such as the Maslach Burnout Inventory,[14,15] General Health Questionnaire,[6,10,16] Utrecht Burn-out scale[17] and the Physician Stress Inventory[18] among others.[19] Measures of physical well-being used in these studies include a linear assessment of quality of life[14] and cardiac alterations.[20] When a more comprehensive health-related quality of life (HRQoL) measure such as SF-36 was used to measure the HRQoL of medical trainees, and the resulting analysis used to compare the HRQoL between doctors and other healthcare professionals, there was no comparison between the junior and senior doctor groups specifically.[21] This article fills the existing gap in

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the literature by doing so.

Determining the HRQoL of junior doctors would be useful in identifying additional issues that they face when compared to their peers as well as their more senior professional counterparts. This, in turn, would be useful in shaping future policy decisions and designing other interventions that would improve the quality of life of junior doctors.

We seek to determine the HRQoL of junior doctors in a tertiary teaching hospital using the SF-36 and to compare their HRQoL with that of population norms and their more senior counterparts.

Materials and Methods

This study was a cross-sectional anonymous, self-administered survey that was conducted in a large tertiary teaching hospital in Singapore in 2008. The study population comprised a convenience sample of 3 different groups of healthcare professionals: doctors, nurses and allied health professionals. A total of 690 participants were invited to participate in the study, which is approximately 10% of the total population of healthcare professionals in the hospital in 2008. The response rate was 83.2%. In this present paper, only the medical doctor population was analysed (i.e. 185 participants who fully responded). The doctor subpopulation was further subcategorised into junior and senior doctors, with junior doctors defined as doctors aged 30 years and below, based on the assumption that all doctors under this age would still be undergoing traineeship.

The aims of the survey were presented to the doctors from both medical and surgical disciplines at departmental meetings. The survey questionnaire was then given to the doctors either during departmental meetings or through the departmental secretaries who acted as intermediaries. Respondents were given sufficient time to complete the survey. Ethics approval was given by the hospital institutional review board.

The Singapore English version of the generic SF-36v2 (short form) questionnaire was used to measure health-related quality of life (HRQoL) in the doctor population. The SF-36 is a generic measure, multi-purpose, short-form health survey with only 36 questions. It has an 8-scale profile of functional health and well-being scores as well as psychometrically based physical and mental health summary measures. The SF-36 has been proven useful in the surveys of general and specific populations. It uses 5-choice response scales and contains 8 different domains, namely Physical Functioning (PF), Role Physical (RP), Bodily Pain (BP), General Health (GH), Vitality (VT), Social Functioning (SF), Role Emotional (RM) and Mental Health (MH). These domains are then categorised into physical (PCS) and mental (MCS) composite scores respectively. The Quality Metric Health Outcomes scoring software version 2 was used to code, calculate and convert all SF-36 items in 8 different domains to a scale of 0 to 100 with 0 being the worst possible health state and 100 being the best possible health state.

Based on the survey responses, the mean SF-36 score differences between junior doctors and general population norms were determined. The SF-36 score population norm calculator, Singapore[23] was used to obtain scores for a matching cohort adjusting for age, gender and ethnicity. The calculator was developed by the Centre for Health Services Research, Singapore Health Services Pte Ltd using results from a SF-36 study performed in Singapore.[24] The normative scores Excel calculator was developed using a population database (N >4000) that was published by Julian Thumboo and colleagues[24] in 2001. The information about frequency of age group, gender and ethnicity of study population were required to obtain population norm scores. By using Excel calculator, the estimates of the norm scores of the study population (in our case, junior and senior doctor population) were obtained. The calculator is unable to generate any variances. We compared the observed scores with derived norm scores whether junior and senior doctors have lower or higher scores. The important score differences between observed and normative scores can be arbitrary and a score difference of 5 points was considered to be clinically significant.[25]

To determine if these scores were not just a reflection on the HRQoL of the doctors in the tertiary hospital, the SF-36 scores of the junior doctors were also compared against the senior doctors using independent sample t-tests. The mean score differences between junior doctors and their senior counterparts were also evaluated. All statistical tests were performed with use of Statistical Package for Social Science (SPSS) 16 Windows version. A *P* value of less than 0.05 was set to be statistically significant.

Results

A total of 185 doctors fully responded in the sample, of which 88 were considered junior doctors (48%). As indicated in Table 1, the junior doctor cohort has a higher proportion of females when compared to the senior doctors, which was statistically significant. There were however, no significant differences among the ethnicity of the study cohorts. Univariate analysis did not reveal any significant differences in the Health-Related Quality of Life scores between the different genders and ethnic groups.

In Table 2, we compare the junior doctor scores with that of the general population and senior doctors. The total of 213 includes those who did not fully respond but completed the SF-36. The results are as follows:

Comparison with General Population

Compared to the age, race and gender adjusted population norms as generated by the calculator (as seen in Fig. 1), junior doctors had lower HRQoL scores in 7 scales, namely; Role Physical (RP), Bodily Pain (BP), General Health (GH), Vitality (VT), Social Functioning (SF), Role Emotional (RM) and Mental Health (MH). Of these, the mean score differences of General Health (–6.9), Vitality (–14.9), Social Functioning (–5.0) and Mental Health (–6.4) were found to be clinically significant. In particular, the difference in Vitality, which measures how energetic the

Table 1. Demographic comparison between Junior and Senior Doctors

	Junior Doctors	Senior Doctors	Remarks
Total	88	97	
Gender			
Male	40	64	
Female	48	33	
Ethnicity			
Chinese	79	81	7 missing values for ethnicity
Malay	3	1	
Indian	4	10	

Table 2. Differences in Health Related Quality of Life between the Different Demographic Groups in Sample

	N		Physical Functioning (PF)	Role Physical (RP)	Bodily Pain (BP)	General Health (GH)	Vitality (VT)	Social Function (SF)	Role Emotional (RE)	Mental Health (MH)
Total	211^	Mean	91.77	84.99	78.67	63.74	50.42	75.53	82.19	68.78
		(SD)	(14.37)	(20.68)	(20.45)	(19.33)	(19.08)	(21.76)	(21.15)	(16.17)
Junior Doctors	88	Mean	94.68	86.36	78.90	63.95	49.10	74.43	80.97	65.77
		(SD)	(11.38)	(20.73)	(21.06)	(18.73)	(17.27)	(22.26)	(21.77)	(14.72)
Senior Doctors	97	Mean	89.69	84.01	78.50	63.58	51.37	76.32	83.06	70.93
		(SD)	(15.89)	(20.67)	(20.10)	(19.82)	(20.30)	(21.46)	(20.74)	(16.87)
P value† (test)			0.013*	0.416	0.891	0.89	0.395	0.535	0.479	0.022*
Normative Scores for 30 and under		Mean	82.1	86.6	82.4	70.8	64.0	79.4	84.3	72.2
Normative Scores for over 30		Mean	82.3	84.4	80.9	68.8	63.8	82.9	81.9	73.1
Male	113	Mean	92.72	86.45	79.33	65.15	52.65	76.00	84.51	69.96
		(SD)	(13.16)	(19.48)	(20.74)	(20.00)	(19.62)	(21.47)	(21.13)	(16.79)
Female	94	Mean	91.04	83.00	77.82	61.45	47.63	74.73	79.34	67.31
		(SD)	(14.82)	(22.12)	(20.42)	(18.20)	(18.28)	(22.52)	(21.30)	(15.61)
P value† (t-test)			0.39	0.24	0.60	0.17	0.06	0.68	0.08	0.25
Chinese	179	Mean	92.29	84.89	79.07	62.85	49.17	75.28	81.75	68.03
		(SD)	(13.70)	(20.49)	(19.28)	(18.86)	(18.90)	(21.85)	(21.53)	(16.28)
Malay	4	Mean	96.25	96.88	75.75	73.50	57.81	90.62	93.75	73.75
		(SD)	(4.79)	(6.25)	(29.29)	(29.49)	(18.66)	(18.75)	(12.50)	(13.15)
Indian	14	Mean	90.20	85.27	78.00	70.43	64.29	75.89	80.36	75.00
		(SD)	(12.63)	(22.55)	(23.95)	(13.44)	(13.74)	(18.65)	(21.58)	(12.09)
Others	7	Mean	81.56	79.46	70.57	62.57	47.32	67.86	83.33	69.29
		(SD)	(23.73)	(30.34)	(39.93)	(28.20)	(26.97)	(32.16)	(23.07)	(24.74)
P value‡ (ANOVA)			0.209	0.616	0.746	0.371	0.03*	0.434	0.722	0.429

* Denotes statistically significant results

† Using t-test

‡ Using ANOVA

^2 out of 213 respondents did not complete the SF-36. Also, there are 26, 4 and 7 missing values for age, gender and ethnicity respectively.

individual is, was 14 points lower, indicating that junior doctors felt much more tired and worn out than the general population norms. The Social Functioning scores were also indicative of a lower amount of social interaction junior doctors had and the level of social support they received. The reduced Mental Health scores can also be interpreted that junior doctors were more likely to exhibit signs of anxiety and depression. The mean difference in scores for Role Emotional was not considered to be clinically significant.

In terms of physical health, it is also shown that junior doctors had lower scores in General Health as compared to population norms, indicating that they perceived themselves to have poorer health than the general population. However, junior doctors scored higher in Physical Functioning (+12.6) when compared to the age, gender and race adjusted general population scores, indicating that these doctors were physically fitter compared to peers with the same age. The differences in scores for Role Physical and Bodily Pain were not considered to be clinically significant.

There were no noticeable differences between observed mean HRQoL scores of senior doctors and their norm scores except in Vitality domain that showed 10.9 points lower and higher Physical Functioning score compared to the norm scores. This suggests that doctors overall feel more worn out mentally (as suggested by the Vitality Scores) but are actually physically fitter (as suggested by the Physical Functioning Scores) than the norm.

Comparison with Senior Doctors

When compared with senior doctors, the junior doctor's Mental Health mean score is the only lower score difference (– 6.3) that was considered to be clinically significant and statistically significant (P = 0.01). Among the physical domains, junior doctors again had higher Physical Functioning scores as well (+3.9, P = 0.04), although the result was not clinically significant. No other differences in scores were found to be clinically or statistically significant.

Discussion

Lower Health-Related Quality of Life of Junior Doctors compared with Senior Doctors and General Population

The quality of life of junior doctors is lower than that of the general population after adjusting for age, gender and race except in Physical Functioning. They have clinically significantly lower scores for General Health, Vitality,

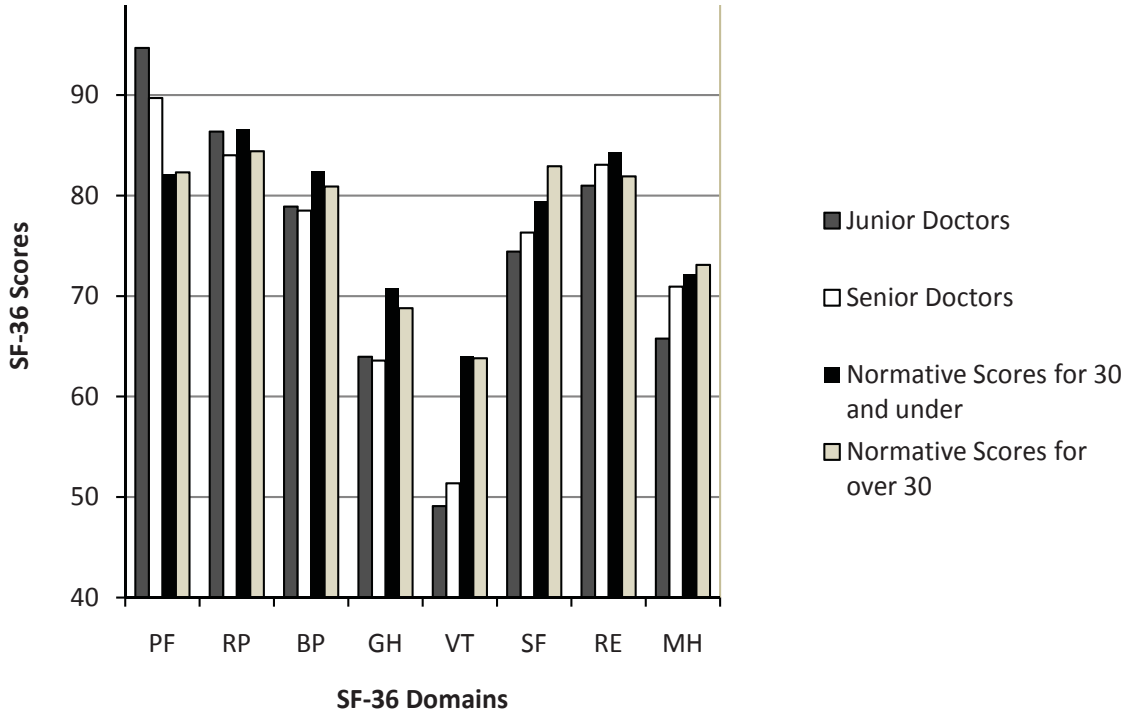

Fig. 1. Comparison of SF-36 Scores between junior doctors, senior doctors and their respective population normative scores.
PF: Physical Functioning; RP: Role Physical; BP: Bodily Pain; GH: General Health; VT: Vitality; SF: Social Function; RE: Role Emotional MH: Mental Health

Mental Health and Social Functioning as compared to the normative scores.[6-10] Junior doctors also had lower scores in all domains except Physical Functioning as compared to the senior doctors. The lower score in Mental Health was also clinically significant. Our study suggests that despite reporting higher scores in Physical Functioning, the HRQoL of junior doctors are adversely affected across the rest of the physical and mental domains as compared to both their peers in the normal population as well as senior doctors. The poorer health related quality of life could have a negative impact on work performance and patient safety in addition to that of the individual's health and is an area that should be examined in greater details locally.

When compared to the senior doctors, it is also interesting to note that junior doctors scored lower in Role Physical, Bodily Pain and General Health even though these scores tend to decrease with increasing age.[26] While the lower scores are not statistically significant, they still do suggest that the physical health of junior doctors in these domains may be affected. Similarly, junior doctors had lower Role Emotional scores, when compared to senior doctors, even though the converse is true in the normative scores as seen in Figure 1. This implies that the junior doctors are less happy in their roles when compared with senior doctors. The lower mental health scores are consistent with other studies that reported the increased rates of depression among junior doctors.[6-10]

With regard to the physical domains of SF-36 (including Physical Functioning, Role Physical, Bodily Pain and General Health), the fact that junior doctors score lower in General Health despite having better Physical Functioning also mirrors the findings of other studies that the stress and fatigue take a physical toll on them.[14,20] This may also account for the reports of absenteeism[27] among junior doctors.

It is also interesting to note that on the whole, doctors tend to score much higher on physical functioning and much lower on Vitality when compared to their respective normative scores (Fig. 1). The former observation suggests that doctors as a cohort are physically fitter and hence are more able to physically perform their jobs on a daily basis. The latter observation tends to suggest that the doctors as a cohort feel more exhausted than their normative scores. While the Physical Functioning and Vitality scores appear to be in contradiction with each other, what this finding suggests is that doctors feel more exhausted in spite of actually being physically fitter. Lindeberg at al[28] suggest that this feeling of exhaustion is related to high psychological job demands, job strain or perceived low job support . More work should be done to determine the causes of exhaustion in the local context.

Reasons for Low Health-Related Quality of Life on Well-being of Junior Doctors and the Consequences

Long working hours and possible sleep deprivation[29] have long been considered to be a major source of stress and fatigue, with the median shift call duration of local junior doctors reported to be 30 hours and the median sleep duration reported to be 2 hours.[30] In addition to the workload, the increase in responsibility coupled with the lack of clinical experience[31] also acts as additional stressors. The resultant fears of inadequacy and the fear of reporting mistakes when they occur, may lead to further risks to patient care as well as give additional stress to the junior doctors. The long working hours of junior doctors also have the inadvertent effect of reducing the time they can spend with their family and friends, depriving them of an important source of social support that can help alleviate stress.[9,32] Quine[33] also suggested that workplace bullying may also be an occupational stressor, and reports that 84% of all junior doctors had experienced at least one case of bullying.

In addition to the detrimental effect of stress[1-3] on the junior doctors' HRQoL, it is also important to note that patient safety can be compromised. It is well documented that stressed and fatigued doctors make more clinical mistakes, affecting their clinical performance and thus compromising patient safety. Firth-Covens and Morrison[34] showed that junior doctors with high levels of chronic stress were more likely to make clinical errors. Shanafelt[4] also reported that 53% of junior doctors self-reported that they provided suboptimal care due to burnout syndrome. These studies make the case that interventions are needed to improve the lot of junior doctors all the more urgent.

Doctors themselves are also not likely to seek help when needed, making the problem harder to determine. Gerrity et al[35] suggested that junior doctors tended to work defensively and hide mistakes due to their "fear of personal inadequacy". Levenstein[36] also found that the "idealised image" that patients have of doctors makes it difficult for doctors to seek help even when it is necessary. An added obstacle to having doctors seek help is the perception that senior doctors have towards junior doctors. Senior doctors tend to see the hard working conditions of junior doctors as merely a "rite of passage" and are hence indifferent to their problems.[6] This would only compound the feelings of inadequacy experienced by junior doctors. Lastly, a perceived lack of support from hospital administration would cause junior doctors to experience a "sense of helplessness", making them even more reluctant to seek help.[18]

Interventions to Address Junior Doctors Low Health-Related Quality of Life

A large movement to reduce the working hours of junior doctors,[37] including the introduction of work hour limits by the Accreditation Council for Graduate Medical Education (ACGME) and the European Time Directive[38] in Europe, has been relatively successful in helping to reduce some of the stress and fatigue.[39] For example, ACGME guidelines state residents can only be on active patient duty during call for a maximum of 24 hours, and have an additional 6 hours for education and patient transfer. In addition, they cannot take on new cases after the 24-hour mark.[37] However, issues related to continuity of care and excess workload are unwanted by-products[40] of these measures.

Additional mentorship may also be useful in helping to reduce the stress faced by the junior doctors, in particular with senior doctors sharing with their junior counterparts on how they addressed issues when faced with uncertainty.[41] With the study by Prins et al,[17] it was found that the larger the discrepancy between perceived and preferred reciprocity in the relationship with the supervisor, the more emotional exhaustion residents experienced. Hence, it may be important to foster workplace environments where all parties are deemed to be equitable and there are rewards for the partnership. A systematic review by McCray et al[8] also indicated that there were some useful interventions with meditation type practice and support groups but the level of evidence was insufficient to make any conclusive recommendations.

Study Limitations

Our study is limited by the fact that being a cross-sectional study, it is unable to determine any causal relationships between the low Health-Related Quality of Life of junior doctors and the sources of stress. In addition, as this was not a randomised sample of junior and senior doctors, the results may not be generalisable to all junior doctors from all disciplines. Furthermore, the results may also not be generalisable to all hospitals given that the samples were from a single hospital. Lastly, the arbitrary age cut-off of 30 years old may result in the inclusion of some junior doctors who are still undergoing training to be included in the cohort of senior doctors during analysis, as well as some associate consultants being grouped into the junior doctor category. We had opted not to ask for information on the seniority of the doctor as some departments sampled are very small and this might inevitability compromise the anonymity of their responses. This might have resulted in a high non-response rate or censored responses among junior doctors. A smaller than expected difference in mean scores between junior doctors and senior doctors might be observed as a result.

Conclusion

In conclusion, junior doctors have lower health-related quality of life scores in almost all domains as compared to peers of their age group as well as senior doctors despite better Physical Function. This suggests that support for junior doctors at their workplaces is necessary in order to improve their general health and mental well-being. Their poorer HRQoL could also have serious implications on patient safety. There is a need for more research into the reasons for poorer HRQoL among junior doctors as well as studies to determine effective strategies and policy changes that need to be made to improve the HRQoL of junior doctors.

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