

The relationship between burnout and perfectionism in medical and dental students in Saudi Arabia

Khalid Aboalshamat^{1,*}, Maha Alzahrani², Nejoud Rabie³, Rahaf Alharbi⁴, Roaa Joudah⁵, Shatha Khulaysi⁶, Walaa Alansari⁷

¹Dental Public Health Division, Dept. of Preventive Dentistry, College of Dentistry, Umm Al-Qura University, Saudi Arabia, ^{2,4,5,7}Batterjee Medical College, Jeddah, Saudi Arabia, ³IBN Sina National College for Medical Studies, Jeddah, Saudi Arabia, ⁶Alfarabi Colleges, Jeddah, Saudi Arabia

***Corresponding Author:**

Email: ktaboalshamat@uqu.edu.sa

Abstract

Objectives: The aim of this research was to investigate the relationship between perfectionism and burnout, and the prevalence of burnout, in medical and dental students in Jeddah, Saudi Arabia.

Materials and Method: A cross-sectional study was conducted among 645 clinical-year medical and dental students and interns in Jeddah, Saudi Arabia. Data were collected using a self-reported questionnaire. The Copenhagen Burnout Inventory was used to measure burnout, and the Perfectionistic Self-Presentation Scale was used to measure perfectionism. SPSS version 18.0 was used for statistical analysis. Data were analyzed by linear regression, t-test, and ANOVA.

Results: There was no significant correlation between burnout and any of the three types of perfectionism that were studied. The prevalence of normal or low burnout was 32.1%, and the prevalence of high burnout was 67.9%. The mean (standard deviation) of perfectionistic self-promotion was 42.99 (10.01), of non-display of imperfection was 42.314 (10.70), and of non-disclosure of imperfection was 29.50 (5.95). Burnout was higher in Saudis, students from low-income families, and clinical year students than in other subgroups. None of the three types of perfectionism were significantly correlated with gender, faculty (medicine or dentistry), marital status, family income, or type of college (government or private).

Conclusions: Because medical and dental students suffer from high levels of burnout, health programs to support the students and provide palliative measures for their psychological burdens are recommended.

Keywords: Burnout, Perfectionism, Medical students, Dental students, Saudi Arabia

Introduction

Medical and dental students encounter many challenges that affect their psychological health.^(1, 2) Such challenges include overwhelming academic loads, decreased relaxation time, pressure to maintain high grades, and dealing with specific medical procedures and patients.^(1,3-5) Burnout, which is defined as a syndrome of psychological lethargy, skepticism, and decreased professional capability, happens regularly with individuals who work in jobs involving serving others.⁽⁶⁾ Burnout among medical and dental students is an area of active investigation,⁽⁷⁻¹⁶⁾ because burnout can lead to medical mistakes, contribute to suicide, and have an effect on drug abuse and personal relationships.^(13,16-19) One systematic review concluded that almost half of all medical students are affected by burnout.⁽⁷⁾ However, studies across different countries showed a great variability. The prevalence of burnout among medical students was found to be 22.4% to 52.8% in the United States,^(18,20,21) 35.9% in Pakistan,⁽³⁾ 26.4% in Korea,⁽²²⁾ 75% in Lebanon,⁽²³⁾ 46% in the Netherlands,⁽²⁴⁾ and 10.3% in Brazil.⁽²⁵⁾ Only one of the studies involved students from a private college rather than a governmental college.⁽²³⁾ Two studies have investigated the prevalence of burnout among medical students in Saudi Arabia, in governmental colleges in Riyadh (67.1%)⁽²⁶⁾ and Tabouk (48.6%).⁽²⁷⁾

Fewer studies have investigated burnout among dental students in a number of countries, with burnout prevalence of 22.3% in Turkey,⁽⁸⁾ 7% in Colombia, and 10 to 20% in Germany.⁽²⁸⁾ In two Jordanian studies, dental students had high levels of burnout.^(11,15) However, burnout was not investigated among dental students in Saudi Arabia according to our knowledge.

Despite the apparent higher prevalence of burnout among medical students than among dental students in most studies, a second German study found that dental students had a higher rate of burnout than medical students.⁽¹⁴⁾ This result may be due to different tools being used to measure burnout. No study has investigated burnout among medical or dental students in private colleges in Saudi Arabia.

On the other side, Perfectionism is defined as the liability to set a very high standard for oneself.⁽²⁹⁻³¹⁾ Although perfectionism can improve medical students performance and achievement,⁽³²⁾ it may increase the psychological burden on students. Unhealthy perfectionism was found among dental students, and was linked to the student's stress.^(33,34) Also, two Korean studies linked perfectionism to burnout among medical students.^(29,30) This highlighted its importance to be investigated. Nevertheless, few studies, and none in Saudi Arabia, have investigated perfectionism among medical and dental students.

This study aims to (1) measure the levels of perfectionism and burnout in medical and dental colleges in Jeddah, Saudi Arabia; (2) determine the relationship between perfectionism and burnout in the students; and (3) evaluate the difference in perfectionism and burnout between medical and dental students, and between male and female students.

Materials and Method

In this cross-sectional study, participants were recruited from private and government medical and dental colleges in Jeddah, Saudi Arabia. A convenient sample included medical and dental students in their clinical (4th to 6th) years and interns from Al Batterjee Medical College, Alfarabi Colleges, Ibn Sina National College, and King Abdulaziz University. The required sample size was 358, based on a precession level of 5%, an estimated prevalence level of 50%, and a confidence level of 95%.

Data were collected in the last month of the academic year (2017), during students' final examination days, using either hard-copy or electronic format self-administrated questionnaires. The questionnaires were administrated in English, with some terms translated to Arabic for clarification. The questionnaires were then revised to account for missing data, and were filled out again. For those using the electronic questionnaire, a link was sent to their group leader, who forwarded it to the students through social media. The expected time required to answer the questionnaire was 5–10 minutes. All participants signed a consent form before filling out the hard-copy questionnaire, or consented electronically before filling out the electronic questionnaire. The data were treated anonymously, and all identifiable information was eliminated. As an incentive, a drawing was held for three vouchers, in the amount of 100 SR each, from a famous bookstore in Saudi Arabia; winners were selected randomly from among the participants. The study was approved by the Umm Al-Qura College of Dentistry Institutional Review Board, as a part of a large project to assess the psychological well-being of medical and dental students in Saudi Arabia.

The questionnaires were divided into three sections. Section 1 comprised eight demographic questions including gender, age, faculty (medicine or dentistry), college type (government or private), marital status, academic year, family income, and nationality. Section 2 measured burnout via the Copenhagen Burnout Inventory (CBI), using the work burnout section only.⁽³⁵⁾ Section 3 measured perfectionism using the Perfectionistic Self-Presentation Scale (PSPS).⁽³⁶⁾

The CBI has a Cronbach's alpha of 0.87. It consists of seven questions answered as Always, Often,

Sometimes, Seldom, or Never/Almost Never. Test results were scored as Always = 100, Often = 75, Sometimes = 50, Seldom = 25, and Never/Almost Never = 0. The total CBI score was the average of the scores of the individual questions. Students work burnout was considered normal or low when the CBI score was less than 50, and high when the CBI was 50 or greater.

The PSPS has a Cronbach's alpha of 0.78 to 0.86. It consists of 27 items answered on a scale from 1 (strongly disagree) to 7 (strongly agree). Ten questions are under the perfectionistic self-promotion subscale (the individual tends to look perfect), ten are under the non-display of imperfection subscale (the individual avoids looking imperfect), and seven are under the nondisclosure of imperfection subscale (the individual avoids admission of imperfection). The score of each subscale equals the sum of the scores of the related questions. The higher the subscale scores, the more likely the individual is to be a perfectionist.

Research team members performed data entry on a private, password-protected computer, accessible only by the team. SPSS version 18.0 (SPSS Inc., Chicago, USA) was used for statistical analysis. Descriptive statistics included a frequency table, means, and standard deviations. The data were analyzed by t-test, ANOVA, Tukey's post hoc test and linear regression. A p -value ≤ 0.05 was considered statistically significant.

Results

The participants in this study were 645 medical and dental students. The mean (M) of their ages was 24.51 years, with a standard deviation (SD) of 1.80. Table 1 shows the demographic data of the participants.

The mean level of work burnout for all students was 56.73 (SD = 18.12). Results indicated that 67.9% of students had a high level of work burnout, and 32.1% had normal or low levels of work burnout. The mean level of perfectionistic self-promotion was 42.99 (SD = 10.01), of non-display of imperfection was 42.314 (SD = 10.70), and of non-disclosure of imperfection was 29.50 (SD = 5.95).

Using a linear regression analysis, no significant relationship was found between burnout and perfectionistic self-promotion ($p= 0.146$), non-display of imperfection ($p= 0.939$), or non-disclosure of imperfection ($p= 0.997$). Also, burnout was not significantly age related.

The results of analysis with a t-test, ANOVA, and Tukey's post hoc test, describing the relationships between demographic variables and burnout or perfectionism, are shown in Table 2.

Table 1: Demographic data of 645 participants in Jeddah, Saudi Arabia

		Number	%
Gender	Male	238	36.9%
	Female	407	63.1%
Faculty	Dentistry	363	56.3%
	Medicine	282	43.7%
Nationality	Saudi	480	74.4%
	Non-Saudi	165	25.6%
Marital status	Married	114	17.7%
	Not Married	531	82.3%
Monthly Family Income	Less than 5,000 SAR	72	11.2%
	5,000–15,000 SAR	265	41.1%
	Greater than 15,000 SAR	308	47.8%
College	Batterjee Medical College (private)	171	26.5%
	Alfarabi Colleges (private)	216	33.5%
	Ibn Sina National College (private)	80	12.4%
	King Abdulaziz University (governmental)	178	27.6%
Academic year	Student	301	46.7%
	Intern	344	53.3%

SAR: Saudi Arabia Riyal

Table 2: The relationships between demographic variables and perfectionism or burnout for 645 participants in Jeddah

	Burnout	Perfectionistic self-promotion	Non-display of imperfection	Nondisclosure of imperfection
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Gender				
Male	57.17 (19.86)	42.82 (8.83)	42.06 (10.50)	29.49 (5.35)
Female	56.47 (17.03)	43.08 (10.65)	42.45 (10.82)	29.51 (6.29)
Faculty				
Dentistry	56.86 (15.87)	43.22 (9.91)	42.95 (10.35)	29.64 (5.79)
Medicine	56.56 (20.68)	42.68 (10.15)	41.49 (11.09)	29.32 (6.17)
Academic year				
Student	60.04 (18.17)*	42.73 (10.55)	41.96 (10.75)	29.54 (6.10)
Intern	54.66 (15.51)	43.21 (9.52)	42.62 (10.66)	29.47 (5.83)
Monthly family income				
Less than 5,000 SAR	62.84 (19.38) ^(a)	42.73 (8.77)	43.34 (9.11)	29.26 (5.27)
5,000–15,000 SAR	56.94 (16.90)	42.33 (9.79)	41.77 (10.73)	29.63 (5.64)
Greater than 15,000 SAR	55.12 (18.56)	43.61 (10.44)	42.53 (11.019)	29.45 (6.36)
Marital status				
Married	57.98 (18.46)	43.09 (8.02)	40.66 (10.34)	29.66 (5.427)
Not Married	56.46 (18.05)	42.96 (10.39)	42.66 (10.75)	29.47 (6.07)
College				
Batterjee Medical College (private)	59.73 (18.30)	41.45 (11.55)	40.48 (12.19)	29.21 (6.68)
Alfarabi Colleges (private)	55.80 (15.71)	43.43 (9.65)	43.17 (9.69)	29.72 (5.51)
Ibn Sina National College (private)	54.15 (14.40)	43.95 (10.07)	42.82 (11.02)	29.48 (6.45)

King Abdulaziz University (governmental)	56.13 (21.60)	43.50 (8.65)	42.80 (10.04)	29.54 (5.50)
Nationality				
Saudi	57.96 (18.85)*	43.36 (9.91)	42.83 (10.46) *	29.72 (5.94)
Non-Saudi	53.16 (15.30)	41.91 (10.23)	40.80 (11.26)	28.84 (5.97)

SAR: Saudi Arabia Riyal

* p -value < 0.05

(a) Significant difference between (Less than 5,000 SAR) and both (5,000–15,000 SAR) and (Greater than 15,000 SAR).

Discussion

No significant relationship was found between burnout and any type of perfectionism. This suggests that work driven by a personal desire can sustain an individual's energy without burnout. These results differ from those in Korean studies^(29,30) that found socially-prescribed and maladaptive perfectionism were linked to burnout among medical and dental students. However, those studies did not investigate the three types of perfectionism that were investigated here, and used a different scale. Further cross-cultural studies using a unified scale are recommended.

This study showed a high prevalence of burnout (67.9%) among medical and dental students in Saudi Arabia. This rate was higher than the prevalence of burnout in the United States, Pakistan, Korea, the Netherlands, and Brazil,^(3,18,20-22,24,25) but lower than that in Lebanon.⁽²³⁾ However, it was very similar to that found among medical students in a local study in Riyadh,⁽²⁶⁾ but higher than that of medical students in Tabouk.⁽²⁷⁾ These differences may be due to different methods of measuring burnout, or to measuring students at different times of the year.⁽³⁶⁻³⁸⁾ Thus, medical and dental students in Saudi Arabia seem to have high levels of burnout in general, even though the levels may vary by geographical location and the method of measurement.

It was difficult to compare the prevalence of perfectionism in the medical and dental students in Saudi Arabia to that of other populations, due to the absence of the tool cutoff point, and lack of similar studies using the same measurement tools. The mean values of perfectionistic self-promotion and non-display of imperfection in the present study were similar to those in a study by Hewitt,⁽³⁶⁾ who invented the SPSP. The non-disclosure of imperfection mean was slightly higher in our study than in Hewitt's. This may indicate that medical and dental students are not likely to be more perfectionists than others, but this result needs further validation because our data was gathered during the last month of the academic year, when students may tend to be less perfectionist to cope with cases and assignment submissions.

Burnout was found to be more prevalent among students than interns, among Saudis than non-Saudis, and among those with a low family income than those

with middle or high family incomes. A previous study indicated that Saudi medical and dental students suffer from psychological distress due to higher academic challenges,⁽³⁹⁾ and that this stress may decrease during an internship. Students with low family income may have more family obligations to fulfill, which would increase stress. However, it is difficult to determine why Saudis have more burnout than non-Saudis. A qualitative study is needed to further examine this issue.

The level of burnout did not correlate significantly with gender, faculty, marital status, or type of college (private or governmental). Other studies have had conflicting results on whether gender is significantly related to burnout.^(25,27) Our results contradicted a German study⁽¹⁴⁾ that found dental students to have a higher burnout level than medical students. This may reflect the different nature of education in each country and educational institution.

The three types of perfectionism studied here showed no correlation to gender, faculty, academic level, family income, marital status, or college type. A previous study also showed no difference between males and females in levels of perfectionism.⁽⁴⁰⁾ The non-display of imperfection was higher among Saudis than non-Saudis. This suggests that Saudis may have more concern about, and put forth more effort towards, looking perfect in their lives than do non-Saudis. However, the reason for this is not clear.

This study has several strengths. It was carried out with a relatively large sample from both government and private medical and dental colleges, and only validated measurement tools were used. In addition, this is the first study to investigate perfectionism among medical and dental students in Saudi Arabia.

This study was limited in that it was based on a self-reported questionnaire, a convenient sample, and the use of both electronic and paper questionnaires. The time of the data collection (end of the academic year) caused some students not to participate, which may have resulted in higher scores for burnout and lower scores for perfectionism.

Conclusion

No evidence was found to support a correlation between perfectionism and burnout among medical and dental students in Saudi Arabia. These students have

high levels of burnout in general, and in comparison to their peers in other countries. Students who are Saudis, who are from families with a low income, or who are currently in their academic years are more vulnerable to burnout than those who are not in these subgroups. Perfectionism among the students was found to be within the normal range, except for the non-disclosing of perfectionism. Educational institutions are encouraged to support and improve student's psychological health by providing self-development coaching programs.^(41,42)

Acknowledgements

We would like to thank Abdulelah Alahdal, Abrar Jawhari, Haya Al-Mohimeed, Haya Rashedi, Khulood Alzahrani, Manal Alzahrani, Mees Alotibi and Sarah Alotibi for their help with data collection. This study was self-funded, and authors declare no conflicts of interest.

References

- Alzahem A, Van der Molen H, Alaujan A, Schmidt H, Zamakhshary M. Stress amongst dental students: a systematic review. *Eur J Dent Edu* 2011;15(1):8-18.
- Dyrbye LN, Thomas MR, Shanafelt TD. Systematic review of depression, anxiety, and other indicators of psychological distress among US and Canadian medical students. *Acad Med* 2006;81(4):354-73.
- Muzafar Y, Khan HH, Ashraf H, Hussain W, Sajid H, Tahir M, et al. Burnout and its associated factors in medical students of Lahore, Pakistan. *Cureus* 2015;7(11):e390.
- Dyrbye LN, Thomas MR, Shanafelt TD. Medical student distress: causes, consequences, and proposed solutions. *Mayo Clin Proc* 2005;80(12):1613-22.
- Elani HW, Allison PJ, Kumar RA, Mancini L, Lambrou A, Bedos C. A systematic review of stress in dental students. *J Dent Edu* 2014;78(2):226-42.
- Maslach C, Jackson SE. The measurement of experienced burnout. *J Organ Behav* 1981;2(2):99-113.
- IsHak W, Nikravesh R, Lederer S, Perry R, Ogunyemi D, Bernstein C. Burnout in medical students: a systematic review. *Clin Teach* 2013;10(4):242-5.
- Atalayin C, Balkis M, Tezel H, Onal B, Kayrak G. The prevalence and consequences of burnout on a group of preclinical dental students. *Eur J Dent* 2015;9(3):356.
- Campos JADB, Jordani PC, Zucoloto ML, Bonafé FSS, Maroco J. Burnout syndrome among dental students. *Rev Bras Epidemiol* 2012;15(1):155-65.
- Mafla A, Villa Torres L, Polychronopoulou A, Polanco H, Moreno Juvinao V, Parra Galvis D. Burnout prevalence and correlates amongst Colombian dental students: the Stresscode study. *Eur J Dent Edu* 2015;19(4):242-50.
- Amin WM, Al-Ali MH, Duaibis RB, Oweis T, Badran DH. Burnout among the clinical dental students in the Jordanian Universities. *J Clin Med Res* 2009(4):207-11.
- Dahlin M, Runeson B. Burnout and psychiatric morbidity among medical students entering clinical training: a three year prospective questionnaire and interview-based study. *BMC Med Educ* 2007;7(1):6.
- Dyrbye LN, Thomas MR, Power DV, Durning S, Moutier C, Massie Jr FS, et al. Burnout and serious thoughts of dropping out of medical school: a multi-institutional study. *Acad Med* 2010;85(1):94-102.
- Prinz P, Hertrich K, Hirschfelder U, de Zwaan M. Burnout, depression and depersonalisation—Psychological factors and coping strategies in dental and medical students. *GMS Z Med Ausbild* 2012;29(1).
- Badran D, Al-Ali M, Duaibis R, Amin W. Burnout among clinical dental students at Jordanian universities/L'epuisement professionnel chez les étudiants en dentisterie des universités jordaniennes. *East Mediterr Health J* 2010;16(4):434.
- Galán F, Ríos-Santos J-V, Polo J, Ríos-Carrasco B, Bullón P. Burnout, depression and suicidal ideation in dental students. *Med Oral Patol Oral Cir Bucal* 2014;19(3):e206.
- West CP, Huschka MM, Novotny PJ, Sloan JA, Kolars JC, Habermann TM. Association of perceived medical errors with resident distress and empathy: a prospective longitudinal study. *JAMA* 2006;296(9):1071-8.
- Dyrbye LN, Massie FS, Eacker A, Harper W, Power D, Durning SJ. Relationship between burnout and professional conduct and attitudes among US medical students. *JAMA* 2010;304(11):1173-80.
- Rotenstein LS, Ramos MA, Torre M, Segal JB, Peluso MJ, Guille C. Prevalence of depression, depressive symptoms, and suicidal ideation among medical students: a systematic review and meta-analysis. *JAMA* 2016;316(21):2214-36.
- Wolf MR, Rosenstock JB. Inadequate sleep and exercise associated with burnout and depression among medical students. *Acad Psychiatry* 2016;41(2):174-79.
- Dyrbye LN, West CP, Satele D, Boone S, Tan L, Sloan J. Burnout among US medical students, residents, and early career physicians relative to the general US population. *Acad Med* 2014;89(3):443-51.
- Choi J, Son SL, Kim SH, Kim H, Hong J-Y, Lee M-S. The prevalence of burnout and the related factors among some medical students in Korea. *Korean J Med Educ* 2015;27(4):301-8.
- Fares J, Saadeddin Z, Al Tabosh H, Aridi H, El Mouhayyar C, Koleilat MK. Extra curricular activities associated with stress and burnout in preclinical medical students. *J Epidemiol Glob Health* 2016;6(3):177-85.
- Van Venrooij LT, Barnhoorn PC, Giltay EJ, van Noorden MS. Burnout, depression and anxiety in preclinical medical students: a cross-sectional survey. *Int J Adolesc Med Health* 2015;29(3).
- Costa EFdO, Santos SA, Santos ATRdA, Melo EVd, Andrade Tmd. Burnout Syndrome and associated factors among medical students: a cross-sectional study. *Clinics* 2012;67(6):573-80.
- Almalki SA, Almojali AI, Allothman AS, Masuadi EM, Alaqeel MK. Burnout and its association with extracurricular activities among medical students in Saudi Arabia. *Int J Med Educ* 2017;8:144.
- Albalawi AE, Alhawiti TS, Aldahi AS, Mohammed Y, Alshehri SK, Mirghani HO. The assessment of the burnout syndrome among medical students in Tabuk University, a cross-sectional analytic study. *BRJMCS* 2015;6(1):14-19.
- Pöhlmann K, Jonas I, Ruf S, Harzer W. Stress, burnout and health in the clinical period of dental education. *Eur J Dent Edu* 2005;9(2):78-84.
- Yu JH, Chae SJ, Chang KH. The relationship among self-efficacy, perfectionism and academic burnout in medical school students. *Korean J Med Educ* 2016;28(1):49.
- Kyeon Y-G, Cho S-M, Hwang H-G, Lee K-U. The

- effects of perfectionism on academic achievement in medical students. *Korean J Med Educ* 2010;22(3):205-14.
31. Hewitt PL, Flett GL. Perfectionism in the self and social contexts: Conceptualization, assessment, and association with psychopathology. *J Pers Soc Psychol* 1991;60(3):456.
 32. Ahn D, Kim O. Perfectionism, achievement goals, and academic efficacy in medical students. *Korean J Med Educ* 2006;18(2):141-52.
 33. Henning K, Ey S, Shaw D. Perfectionism, the impostor phenomenon and psychological adjustment in medical, dental, nursing and pharmacy students. *Med Educ* 1998;32(5):456-64.
 34. Sullivan LM. *Essentials of biostatistics in public health*. 2nd ed: Burlington, MA: Jones & Bartlett Learning; 2012.
 35. Kristensen TS, Borritz M, Villadsen E, Christensen KB. The Copenhagen Burnout Inventory: A new tool for the assessment of burnout. *Work Stress* 2005;19(3):192-207.
 36. Hewitt PL, Flett GL, Sherry SB, Habke M, Parkin M, Lam RW. The interpersonal expression of perfection: Perfectionistic self-presentation and psychological distress. *J Pers Soc Psychol* 2003;84(6):1303.
 37. Borritz M, Rugulies R, Christensen K, Villadsen E, Kristensen T. Burnout as a predictor of self-reported sickness absence among human service workers: prospective findings from three year follow up of the PUMA study. *Occup Environ Med* 2006;63(2):98-106.
 38. Aboalshamat K, Hou X-Y, Strodl E. Psychological health of medical and dental students in Saudi Arabia: A longitudinal study. *Public Health Res* 2014;4(5):179-84.
 39. Aboalshamat K, Hou X-Y, Strodl E. Psychological well-being status among medical and dental students in Makkah, Saudi Arabia: A cross-sectional study. *Med Teach* 2015;37(suppl):S75-S81.
 40. Stoeber J, Stoeber FS. Domains of perfectionism: Prevalence and relationships with perfectionism, gender, age, and satisfaction with life. *Pers Individ Dif* 2009;46(4):530-5.
 41. Aboalshamat K, Hou X-Y, Strodl E. The impact of a self-development coaching programme on medical and dental students' psychological health and academic performance: a randomised controlled trial. *BMC Med Educ* 2015;15(1):134.
 42. Aboalshamat K, Hou X-Y, Strodl E. Improving dental and medical students' psychological health using a self-development coaching program: A pilot study. *J Adv Med Res* 2013;3(3):45-57.