

RESEARCH BRIEF

Perceived Stress, Stressors, and Coping Mechanisms Among PGY1 Pharmacy Residents

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Objective. To evaluate perceived stress among postgraduate year 1 (PGY1) pharmacy residents and to examine relationships between perceived stress and certain demographic variables. Main stressors during residency training and coping mechanisms used were also determined.

Methods. A link to a web-based survey was sent to 1128 pharmacy residency program directors who were asked to forward it to current PGY1 residents in their programs. The 22-item questionnaire included the 10-item Perceived Stress Scale (PSS-10), demographic information, number of working/sleeping hours, and major stressors and coping mechanisms.

Results. There were 505 responses collected from PGY1 residents of community pharmacy, managed care, and pharmacy practice residency programs across the US. Females reported higher PSS-10 scores than males. Perceived stress scores were similar across age groups. Single residents and married residents exhibited similar PSS-10 scores. Residents with children had higher stress score compared to residents without children. Perceived stress scores were similar across types of PGY1 residency programs. A higher number of working hours was associated with a higher PSS-10 score. Time pressures, work overload, and fear of error were the top stressors reported. Spending time with family and friends, staying optimistic, and engaging in enjoyable activities were the top coping strategies employed by participants.

Conclusion. Female gender, having children, working longer working hours, and desire to change residency program were associated with higher PSS-10 scores. Approximately a third of the participants associated perceived stress with activities related to residency training (time pressures, workload, fear of errors) and report the use of positive coping strategies to deal with stress.

Keywords: pharmacy residency, perceived stress, stressor, coping mechanisms

INTRODUCTION

Stress associated with residency training is well documented. Most of the available literature discusses stress experienced by resident physicians. Data show that medical residency training is associated with increased level of stress, burnout syndrome and depression, and decreased quality of life.¹⁻⁴ Some reports found that stress negatively affects patient care, is associated with medical errors, and increases risk of motor-vehicle accidents.⁵⁻⁷

Medical residents experience multiple stressors. Some of the stressors include time pressure, number of working hours, financial situation, working conditions, personal and family relationships.^{8,9} There may be other unique stressors associated with different subspecialties as well. However, there is insufficient data regarding

stress during pharmacy residency training. Lee evaluated scores on perceived stress, anxiety, depression, hostility and dysphoria among postgraduate year (PGY1 and PGY2) pharmacy residents and correlation between stress and negative affect levels.¹⁰ In the study, there were no significant differences in stress, anxiety, depression and dysphoria levels between PGY1 and PGY2 residents.¹⁰ Scores for hostility were higher for PGY2 residents.¹⁰ Residents who worked more than 60 hours per week had higher perceived stress, depression, hostility and dysphoria scores.¹⁰ Pileggi and colleagues conducted a survey among pharmacy residents to determine their preparedness for unsettling clinical events.¹¹ Their study found that while pharmacy residents have infrequent exposure to unsettling events, they need to be better prepared for the emotional challenges of patient care.

The primary purpose of this study was to evaluate perceived stress in PGY1 pharmacy residents during various types of pharmacy residency training. Secondary

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objectives of this study were to determine relationships between perceived stress and demographic variables such as gender, age, marital status, number of children, hours worked, type of pharmacy residency program, and desire to change residency program. In addition, this study was designed to determine main stressors during pharmacy residency training and coping mechanisms used by pharmacy residents.

METHODS

The study was approved by Samford University's Institutional Review Board. The survey was conducted between September and October 2016. Contact information for pharmacy residency program directors (n=1128) across the US was obtained through the online American Society of Health-System Pharmacists residency directory. Pharmacy residency program directors were contacted via email and asked to forward a survey link to their current PGY1 pharmacy residents. Residents in community pharmacy, managed care, and pharmacy practice residency programs in the first trimester of their residency training participated in the survey. Participation was voluntary and anonymous. Data were collected online using Qualtrics (Provo, UT).

The 22-item questionnaire included the 10-item Perceived Stress Scale (PSS-10) and questions about demographic information, major stressors and coping mechanisms. The PSS-10 was developed by Cohen and colleagues to measure the degree to which individuals perceive their life as stressful and has been widely used in the literature.^{10,12-14} The questions are general in nature and not specific to any population group. The questions ask how often respondents felt or thought a certain way during the last month. The scale has a 5-point Likert response format (from zero to four). The total score is calculated by summing the responses. Individual scores on the PSS-10 can range from zero to 40 with higher scores indicating higher perceived stress. Demographic characteristics including gender, age, marital status, number of children in the household, and type of residency program were collected. Residents were not asked to disclose institution name of their residency program or current geographical location. Number of work and sleep hours were collected as well. To identify main stressors and coping mechanisms, pharmacy residents were asked to select and rank up to three stressors and coping strategies from the list provided in the survey. The list of stressors and coping strategies was developed using lists found in the literature.^{9,15,16} A career decision question was asked to determine if residents would choose a different residency program if they had it to do all over again. Residents were not asked to specify what residency program they would prefer.

Statistical analyses were conducted using SPSS v. 23 (IBM, Armonk, NY). Student *t*-test was used to determine differences in the mean stress scores between two groups. ANOVA with post-hoc Tukey tests were used to compare differences in the mean stress scores for three or more groups. A *p* value of <.05 was considered statistically significant.

RESULTS

Demographic data for survey participants and mean PSS-10 scores, standard deviations, and *p* values are presented in Table 1. Stressors, coping strategies, and frequencies reported by pharmacy residents are presented in Tables 2 and 3. The response rate to the survey is 16.6% (505 of the potential 3041 PGY1 residents who matched in 2016). The demographics of study responders (70% female, 48% 25-years-old or under, and 27% married) are similar to published national data on PGY1 resident demographics, with the exception of age (35% 25-years-old or under in previous study).¹⁷

Seventy percent of participants were female who reported higher mean perceived stress score compared to males. Ninety-three percent of responding residents were under 30-years-old. All age categories reported similar mean stress scores. Most of the residents were single (72%). Single and married residents exhibited similar mean stress scores. Most of the participants reported no children in the household (96%), although 4% of residents who have children in their households exhibited higher mean perceived stress score compared to residents without children. Residents in community pharmacy residency program reported higher stress score compared to residents in managed care and pharmacy practice residency programs. However, effect of residency program type on mean perceived stress score did not reach statistical significance. Fifty-three percent of residents reported working 40-60 hours per week, while 47 reported working more than 61 hours per week during the previous month. Statistical analysis revealed higher mean perceived stress score for residents working 61 hours per week or more. Most of the participants reported no desire to change residency program (73%). A smaller number of residents were undecided if they would like to change their residency program at the time of the survey (19%), and eight percent exhibited a desire to change their current residency program. These two subgroups together reported higher mean perceived stress scores compared to residents who were satisfied with the program. The mean sleeping hours per night was 6.3 hours. Time pressures, work overload, and fear of error were the top three stressors. The top three coping strategies reported by the

Table 1. Demographic Data and Mean Perceived Stress Scores

	N (%)	Mean PSS 10 Score (SD)	p value
Total	505	17.6 (5.9)	
Gender			
Male	150 (30)	16.6 (6.4)	
Female	355 (70)	18.1 (5.8)	.02
Age			
≤25	244 (48)	17.4 (5.8)	
26-30	223 (44)	17.9 (5.8)	
≥31	38 (8)	17.9 (8.1)	.65
Marital status			
Married/Living with mate	138 (27)	17.7 (6.9)	
Single/Never wed	367 (73)	17.6 (5.6)	.91
Children in the household			
No children	484 (96)	17.5 (5.9)	
Children	21 (4)	20.6 (6.7)	.02
Residency program			
Community Pharmacy	53 (11)	19.0 (6.3)	
Managed Care Pharmacy	16 (3)	16.2 (3.8)	
Pharmacy	436 (86)	17.5 (6.0)	.16
Number of working hours per week			
≤60	266 (53)	16.5 (5.8)	
≥61	239 (47)	18.9 (5.9)	.00
Desire to change residency program			
Yes	4 (8)	20.5 (6.9)	
No	366 (73)	16.5 (5.6)	
Undecided	98 (19)	20.8 (5.5)	.00

participants were spending time with family and friends, staying optimistic and engaging in enjoyable activities.

DISCUSSION

In this study, mean PSS-10 score was higher than mean perceived stress scores for the general population but consistent with stress scores for other health care students and medical residents.^{10,12-14,16} Previously reported PSS-10 scores for the general population have typically ranged from 12 to 14, with younger population exhibiting higher stress scores.¹² There was no significant association between age and mean stress score in this study. Birks and Lebensohn reported similar findings for health care students and PGY1 medical residents.^{13,14} However, Cohen studied perceived stress in the general population and reported statistically significant increase in stress scores for younger (18-29 years of age) populations compared to older ones.¹² Beall and colleagues reported higher perceived stress score for younger (under 22 years

of age) doctor of pharmacy students as well.¹⁶ Additionally, perceived stress scores for female residents were higher than for male residents. This finding agreed with other reports found in the literature.^{8,12,16} It might be that females are more likely to experience emotional and physical problems such as depression and fatigue compared to males, and, therefore, more likely to report higher stress levels.^{9,18}

There are inconsistent data in the literature regarding the effect of marital status on stress. Cohen and colleagues found that married people in the general population experience less stress compared to single individuals.¹² Hamza and colleagues reported no difference in stress scores for married versus single medical residents.¹ Cohen and colleagues found that single medical residents experience higher stress compared to married medical residents.¹⁹ In the current study, perceived stress score did not vary based on marital status. Further studies may be needed to examine the effect of marital status on stress in pharmacy residents.

Table 2. Stressors Reported by PGY1 Pharmacy Residents

Stress Factor	N (%)
Time pressures	177 (35)
Work overload	163 (32)
Fear of error	140 (28)
Insufficient sleep	127 (25)
Number of working hours	120 (24)
Financial situation	93 (18)
Residency program	82 (16)
Not enough time to spend with family/friends	78 (16)
Pressure to conduct research/publish	69 (14)
Pressure to teach/do extra projects	68 (14)
Variability of expectations	64 (13)
Learning new things	50 (10)
Poor communication	45 (9)
Requiring high level of skill	41 (8)
Living separately from family	31 (6)
Other	28 (6)
Poor mentoring/inadequate supervision	27 (5)
Caring for own family members/children	17 (3)
Personal health concerns	12 (2)
Caring for patients	11 (2)
Working conditions	7 (1)
Intimidation/harassment/hostility from coworkers	5 (1)
Favoritism/Bias	4 (1)
Obtaining help from supervisors	4 (1)

Cohen and colleagues found that perceived stress scores in the general population rose with increasing number of children in the household.¹² Effect of children in the household on stress among other health care residents is less studied, and therefore, it is difficult to compare this study's results with results of other studies. In this study,

Table 3. Coping Strategies Reported by PGY1 Pharmacy Residents

Coping Strategy	N (%)
Spending time with family/friends	249 (49)
Staying optimistic	199 (39)
Engaging in enjoyable activities	190 (38)
Exercising/sports	172 (34)
Sleeping	117 (23)
Consulting others	115 (23)
Watching TV	114 (23)
Praying or seeking spiritual help	72 (14)
Eating more/less	71 (14)
Spending time alone	59 (12)
Drinking alcohol	49 (10)
Shopping	34 (7)
Playing video/online games	30 (6)
Blaming yourself	9 (2)
Using tobacco products	4 (1)
Using drugs/medications/herbals	3 (1)

the difference in mean perceived stress score for residents with children compared to residents without children was statistically significant. It is interesting to note that only 3% of pharmacy residents in this study selected caring for own family members and children as a stress factor. Role strain might be one of the factors contributing to a higher level of stress. It is possible that managing both residency and family increases stress level for residents with children as these activities require time and full attention from trainees. Another consideration involves feelings of guilt reported by female medical residents whether they spend time with family or take care of patients.²⁰

Lee conducted a survey among pharmacy residents and found that pharmacy residents working more than 60 hours per week experienced significantly higher stress levels.¹⁰ Cohen and colleagues reported that medical residents who worked more hours per week reported higher stress scores.¹⁹ In this study, pharmacy residents who worked 61 hours per week or more had higher perceived stress scores compared to residents who worked 60 hours per week or less. It is possible that longer working hours contribute to work-life imbalance, life and career dissatisfaction and therefore, lead to higher perceived stress levels. This suggestion is supported by findings in other health care providers presented by Dall'Ora.²¹ The study determined that nurses working more than 12 hours were more likely to experience burnout, job dissatisfaction and intention to leave the workplace. In this study, about a quarter of respondents indicated insufficient sleep and number of working hours as stressors. Prior literature findings demonstrate that poor sleep and long work hours are associated with increased risk of cardiovascular disease, metabolic syndrome, gastrointestinal disorders and other diseases.^{22,23} In the wake of negative effects of long work hours, the Accreditation Council for Graduate Medical Education mandated 80-hour per week duty limits for residents and 16-hour continuous duty maximums for PGY1 residents to improve patient safety, residents' well-being and education.²⁴ Although research links long work hours with detrimental effects on well-being, research on this "capping" of hours found surprising effects of limiting duty hours for residents on patient care outcomes. According to published data, limiting duty hours had negative effects on residents' education, did not improve clinical outcomes or patient safety, and had inconsistent effects on residents' well-being.²⁴⁻²⁸ Considering research data, a single measure such as limiting work hours does not appear to adequately address the issue.

In this study, community pharmacy residents exhibited higher stress score compared to residents in managed care and pharmacy residency programs. However, this did not reach statistical significance. It is likely that a larger sample

size was necessary to determine statistical significance between subgroups. Further studies are needed to determine if differences in stress scores between types of residency programs exist. To the authors' knowledge, no published data is available regarding differences in stress scores among types of PGY-1 pharmacy residency programs.

Satisfaction with the residency program was associated with lower perceived stress scores in this study. Residents who were satisfied with their current residency program reported significantly lower perceived stress score. Comparing residents who were uncertain about their residency program to residents who would like to change their residency program demonstrated no significant difference in perceived stress scores for these two subgroups. Studies found in the literature showed that participants who reported higher stress level tend to report lower work satisfaction or tendency to leave the workplace.^{29,30} Factors such as work conditions, work time, job-related well-being, etc. can contribute to job dissatisfaction;^{12,31} therefore, some of the stressors reported by pharmacy residents in this study might be the factors contributing to dissatisfaction with the residency program. Considering that both stress and work satisfaction are complex constructs, further studies are needed to determine correlation between components of perceived stress and dissatisfaction with residency program among pharmacy residents.

In this study, several sources of the residents' perceived stress appeared to be tied to residency training (work overload, fear of error, number of working hours, residency program, pressure to conduct research/publish, pressure to teach/do extra projects). Time pressures, work overload, and fear of error were the top three stressors reported. Similar results were reported in other studies. Cohen and colleagues found that 70% of resident physicians indicated time pressure as their top stressor.⁸ Stress due to work overload was reported by 97% of pathology residents in Joseph and colleagues' study.¹⁵

In this study, most of the pharmacy residents reported using positive techniques to deal with stress. Spending time with family and friends, staying optimistic, and engaging in enjoyable activities were the main coping strategies reported. These strategies were like the strategies reported in other studies. Cohen and colleagues reported that talking to others and looking at the "bright side of things" were the main coping strategies for medical residents.⁸ In another study, Cohen and colleagues reported that talking to others, doing something enjoyable, and looking at the "bright side of things" were the main dealing-with-stress strategies for medical residents.¹⁹

This study has limitations. Small sample size for certain subgroups could have resulted in less power than

needed to detect statistical significance. Possible response bias is another limitation. Residents experiencing higher stress may be less likely to participate in the survey, and therefore, it is possible that stress is underscored in this study. In addition, the list of stressors and coping strategies might not include all items prevalent among pharmacy residents.

As pharmacists expand their role and carry more responsibility for patient care outcomes, the detrimental effect of stress on psychological and physical well-being could lead to suboptimal outcomes and could put patients and pharmacists at risk. New accreditation Standards 2016 for professional program in pharmacy issued by the Accreditation Council for Pharmacy Education (ACPE) are an important step toward recognizing the issue.³² The ACPE Standards suggest that pharmacy schools measure perceived stress in faculty, staff and students as a component of assessment to identify underlying causes of poor performance. To combat stress and improve performance and well-being of pharmacy students, pharmacy schools and colleges would have to evaluate other schools' approaches. Various medical schools, realizing the increased stress their students are vulnerable to, have recognized the need and have developed and implemented wellness programs that help combat stress, depression and burnout in trainees that are worthy of review by the academy. The University of California San Diego School of Medicine launched the suicide prevention and depression awareness program for students, residents, fellow and faculty physicians.³³ The results revealed that about 27% of respondents who completed the screening tool were at high risk for depression and suicide and 67% met the criteria for moderate risk. In these categories, less than 20% of respondents were currently receiving professional help. According to the report, 63 residents and fellows completed the screening, and 22% of them were referred to mental health professional for evaluation and treatment. The University of Massachusetts Medical School developed a mindfulness-based stress reduction program that has been taught to medical residents and doctors for over 20 years. A randomized clinical trial showed that after attending the program, medical residents and students reported reduced stress levels, increased quality of life and gained more self-compassion.³⁴ The University of South Florida College of Medicine developed a residency assistance program in 1997, which provides confidential evaluation, brief counseling and referral services for residents. According to the report, the program was rapidly accepted, and 193 cases were initiated by residents or family members in over 8 years.³⁵ Fifty-three percent of these residents reported emotional problems (anxiety,

depression, stress), followed by marital problems, financial and legal problems. Residents obtained assistance from the program counselors or were referred to an outside resource. Ninety-seven percent of referrals were immediately accepted by the participants. The Yale University School of Medicine and the University of California, Irvine School of Medicine conducted a randomized controlled trial to determine an effect of a wellness program on anesthesiology residents' well-being.³⁶ Their data showed a statistically significant decrease in anxiety and stress as a parent, increase in problem solving and social support coping in an intervention group compared to the control group.

These are a few examples of various programs that some schools implemented to help medical residents during residency training. The data suggest that such wellness programs are beneficial for residents, students, faculty and staff and should be developed and available to pharmacy residents as well. Wellness programs would help trainees succeed in their career, be more engaged in their work, and maximize quality of care provided to patients.

CONCLUSION

This study revealed that pharmacy residents experience elevated stress levels during pharmacy residency training. Female gender, having children, longer working hours, and desire to change residency program were associated with higher perceived stress scores. The main stressors reported by PGY1 residents were related to residency training. Half of the participants used positive stress-alleviating techniques such as spending time with family and friends to reduce stress. More work needs to be done to promote awareness of the issue among pharmacy professionals to recognize common stressors and to consider developing wellness programs helping pharmacy residents proactively reduce stress. A program that helps with a wide range of work, family and personal problems during residency training might be necessary.

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