



### Research Article

## Comfort Levels of Physical Medicine & Rehabilitation Residents during Call: A Survey Study

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### Abstract

#### Background

There are few studies in the literature reviewing how comfortable residents are during call, especially in the field of Physical Medicine & Rehabilitation (PM&R). The aim of this study was to review how prepared residents feel during call as well as gather general information about residency call in the field of PM&R in the hope of improving the quality of call.

#### Methods

An anonymous online survey made up of 7 questions addressing level of comfort during call, reason for paging, level of training, type of internship was sent out to the ACGME PM&R programs in the United States/US territories.

#### Results

A total of 221 PM&R residents from at least 48 programs across 25 states/US territories participated in the survey. The top 3 reasons for which residents were getting paged during call were pain, abnormal vital signs, and bowel/bladder issues. The top 3 items residents were least comfortable with handling during call were running a code, arrhythmias and seizures. The top 3 items residents were most comfortable with were constipation, pain and insomnia. 50% of unique programs were found to take home call, 19% in-house call and 31% home and/or in-house call. 46% of residents completed their PGY-1 training in a preliminary medicine program, 36% in a

transitional year program, 6% in a preliminary surgery program, and 12% in another type of program.

#### Conclusion

This study gives an idea of the common reasons why residents are getting paged during call and what residents feel comfortable and uncomfortable handling while on call. This information can better guide residency programs in regards to their educational conferences and improve the quality of PM&R residency call and ultimately patient care.

**Keywords:** Physical medicine and rehabilitation; Post graduate year; Rehabilitation; Residency; Residency call

### Introduction

July is often a stressful transitional period in academic hospitals across the United States as medical students are being transitioned into a full time residency or as many interns are being transitioned into a new specialty. Taking call is often a major contributor to the stress of being a resident, whether novel or seasoned. In a previous study looking at the causes of stress among residents, lack of sleep and frequent overnight call were found to be the top two negative factors [1]. As overnight call and lack of sleep often go hand in hand, information in regards to residency call would be of value to improve the quality of call for residents.

Although there is a fair amount of literature looking at residency call in other specialties, there has been little research in regards to residency call in the field of Physical Medicine and Rehabilitation (PM&R). The primary objective of this study was to look at resident comfort level during call in the field of PM&R; specifically looking at what residents are being paged about and how comfortable they feel handling common and uncommon issues that arise during call. The secondary objective was to look at if resident comfortability is correlated with the type of preliminary internship that was done and the Postgraduate Year (PGY) level. With more knowledge regarding what residents are being paged about and better preparation of residents, the hope of this study is to provide a smoother transition into residency call, improve the quality of call for all residents and ultimately improve patient care.

### Methods

An anonymous online survey made up of 7 questions was sent out to the program coordinators of the Accreditation Council for Graduate Medical Education (ACGME) accredited PM&R programs listed in the Fellowship and Residency Electronic Interactive Database Access (FREIDA) system in February 2016 (Table 1). Questions were presented in multiple-choice and free response format, designed to address many issues ranging from comfort level during call to the type of preliminary training completed. The first question addressed comfortability across twenty issues dealt with during PM&R call across a five point Likert scale with 1 being "very uncomfortable", 2 being "uncomfortable", 3 being "neutral", 4 being "comfortable" and 5 being "very comfortable". There was also a N/A option on the Likert

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scale. A reminder email was sent out to the program coordinators two weeks after the survey was opened. The survey was open for a total of three weeks.

Survey Questions
1. How comfortable do you feel when handling the following issues while on call? *
2. Please list any other issues not mentioned above that you felt uncomfortable dealing with while on call (FR).
3. What are the top three issues you get paged about while on call? (FR)
4. Do you take home call or in house call?
5. What is your PGY level?
6. If applicable, what type of internship did you complete?
7. Name of your residency program (FR).

**Table 1:** Survey questions.

FR=Free Response

\* 20 issues listed: Fever, Pain, Fall, Hyperglycemia/Hypoglycemia, Hypertensive urgency/Emergency, Hypotension, Chest pain, Arrhythmia, Shortness of breath, Oxygen desaturation, Abdominal pain, Constipation, GI bleed, Dysuria/Hematuria, Headache, Seizure, Altered mental status, Agitation/Combativeness, Insomnia, Running a code.

### Statistical analysis

The results of the survey were tabulated. Statistical analysis was done to compare comfort levels across training levels as well as across type of preliminary training for the 20 issues listed in question 1. Responses were grouped into comfortable or uncomfortable. Comfortable was defined as a score of 4 (comfortable) or 5 (very comfortable) on the Likert scale. Uncomfortable was defined as a score of 3 (neutral) or less (uncomfortable, very uncomfortable) on the Likert scale. For comfort across training level, a two group comparison was done. Respondents were placed into PGY-2 or PGY-3/PGY4. The reason for this grouping was because a preliminary analysis of the data showed similar percentages of comfort across the twenty items for PGY-3 and PGY-4. Results from PGY-1 residents were excluded from the statistical analysis portion due to a low response rate and as most of the PGY-1 year is not spent within the PM&R department. Statistical significance was determined using the Pearson’s chi-square test and Fisher’s exact test. A three group comparison was used to compare comfort level across preliminary training type (internal medicine, surgery or transitional year) using the same methods. Those respondents who responded “other” for a preliminary training program were omitted from both analyses.

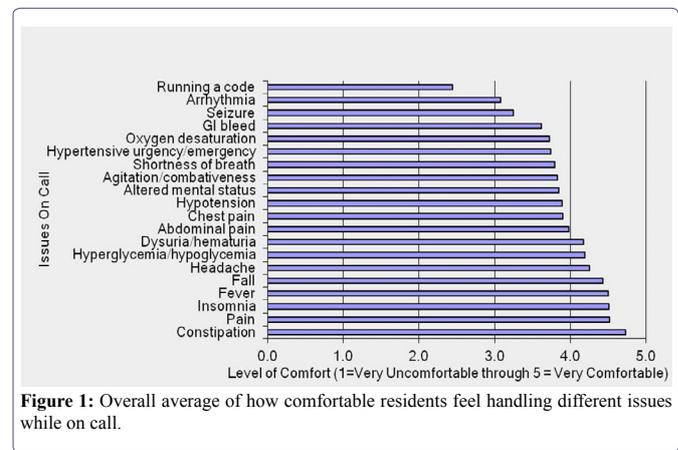
### Results

A total of 221 PM&R residents from at least 48 of the 79 ACGME accredited programs contacted participated in the survey. Geographically, this was spread across 25 of the 29 states/US territories with PM&R programs. The participants included 5 PGY-1, 78 PGY-2, 69 PGY-3 and 69 PGY-4 residents. Fifty percent of unique programs were found to take home call, 19% in-house call and 31% home and/or in-house call. Forty six percent of residents completed their PGY-1 training in a preliminary medicine program, 36% in a transitional year program, 6% in a preliminary surgery program and 12% in another type of program including obstetrics and gynecology, pediatrics and a combined medicine/surgery program. The top reasons for which residents were getting paged during call were pain, abnormal

vital signs, bowel/bladder issues, insomnia, blood sugars, agitation/ altered mental status, and falls in descending order (Table 2). Figure 1 shows the average of responses on the 5 point Likert scale for each of the 20 issues residents were asked to rate their comfortability in. The three items all residents were least comfortable with handling during call were running a code, arrhythmias and seizures, in descending order. The three items residents were most comfortable with handling during call were constipation, pain and insomnia, in descending order. Broken down by post graduate year, PGY-1 residents reported most comfort handling pain and least comfort handling arrhythmias and altered mental status. After PGY-1, the items which residents were most comfortable and least comfortable with handling during call were the same across post graduate year with most comfort handling constipation and least comfort running a code. Other issues that residents felt uncomfortable with handling during call were autonomic dysreflexia, sympathetic storming, baclofen pumps, and social issues (Table 3).

Top Reasons for Getting Paged
1. Pain
2. Abnormal vital signs
3. Bowel/Bladder issues
4. Insomnia
5. Blood sugars
6. Agitation/AMS
7. Falls

**Table 2:** Top reasons for getting paged.



Death of a patient
“Anything pediatric”
Autonomic dysreflexia
Sympathetic storming
Baclofen pumps
Social issues and family questions
Tube issues
LVAD patients
Cancer patients
Reading EKGs

**Table 3:** Other issues residents feel uncomfortable dealing with while on call.

Comparing across training level, PGY-3's and 4's were found to be more comfortable handling hyperglycemia/hypoglycemia, hypotension, seizure, altered mental status and agitation/combativeness compared to their PGY-2 counterparts (Table 4). The difference in comfortability between the two groups was the largest in handling altered mental status with 81% of PGY-3's and 4's feeling comfortable handling altered mental status compared to 60.9% of PGY-2's (p=0.003). The smallest difference in comfort level was for handling hyperglycemia/hypoglycemia with 84.3% of PGY-3's and 4's feeling comfortable compared to 72.5% of their PGY-2 counterparts (p=0.49). There were no other statistically significant differences in comfort levels across the remaining issues although higher comfortability was seen across all items in the senior residents.

In regards to the type of preliminary training year, there were statistically significant differences in comfort levels for arrhythmia, constipation and dysuria/hematuria (Table 5). Those residents trained in a preliminary medicine year were more comfortable handling the abovementioned issues followed by those trained in a transitional year followed by those trained in a preliminary surgical year. Although there were no other statistically significant differences in comfort levels across the remaining issues, there was a general trend with higher comfort levels seen in those trained in preliminary medicine.

## Discussion

This survey study is one of few studies in the literature reviewing PM&R call. The overall pattern that was seen was an increase in

general comfort level with handling call as residents progressed in their training level, which is expected. It was also found that those residents trained in a preliminary medicine program felt more comfortable during call followed by those trained in a transitional year followed by those trained in a surgical year. This may partly be due to the fact that PM&R residents are expected to be able to manage patients' medical issues on an acute inpatient rehabilitation floor which is often more heavily medicine based rather than surgery based. This data supports the notion that future residents going into PM&R may benefit from doing an internal medicine preliminary year, if applicable. It is also not surprising that what residents found most comfortable and least comfortable were similar across PGY-2 through PGY-4, as a bowel regimen is something PM&R residents are heavily trained in as opposed to running a code which is rarely experienced on a rehabilitation floor. Only 20% of overall residents were found to feel comfortable running a code and 40% were found to feel comfortable handling arrhythmias. This data shows that these topics may need to be more heavily focused on during educational conferences or preparation for taking call. It is however reassuring that the top issues residents reported getting paged about, which included pain, bowel/bladder issues and insomnia, were also what residents on average felt most comfortable handling during call. This shows that residents feel adequately prepared for some of the more common issues faced with during call.

Residency Call	PGY-2 69 (36.1%)		PGY-3 and PGY-4 122 (63.9%)		Total (N=191)	p
	Count	Percentage	Count	Percentage	Count (Percentage)	
Fever	64	92.80%	117	95.90%	181 (94.8%)	0.5
Pain	66	95.70%	119	97.50%	185 (96.9%)	0.669
Fall	61	88.40%	116	95.10%	177 (92.7%)	0.089
Hyperglycemia/Hypoglycemia	50	72.50%	102	84.30%	152 (80.0%)	0.049
Hypertensive urgency/Emergency	43	62.30%	90	73.80%	133 (69.6%)	0.098
Hypotension	46	66.70%	101	82.80%	147 (77.0%)	0.011
Chest Pain	51	73.90%	98	80.30%	149 (78.0%)	0.304
Arrhythmia	25	36.20%	53	43.40%	78 (40.8%)	0.33
Shortness of breath	46	66.70%	94	77.00%	140 (73.3%)	0.119
Oxygen desaturation	44	63.80%	87	71.90%	131 (68.9%)	0.244
Abdominal pain	55	80.90%	100	82.00%	155 (81.6%)	0.853
Constipation	65	97.00%	120	98.40%	185 (97.9%)	0.616
GI bleed	40	58.00%	76	62.30%	116 (60.7%)	0.557
Dysuria/Hematuria	50	73.50%	103	84.40%	153 (80.5%)	0.069
Headache	63	91.30%	111	91.70%	174 (91.6%)	0.918
Seizure	23	33.30%	63	52.10%	86 (45.3%)	0.013
Altered mental status	42	60.90%	98	81.00%	140 (73.7%)	0.003
Agitation/Combativeness	38	55.10%	92	75.40%	130 (68.1%)	0.004
Insomnia	62	92.50%	116	95.90%	178 (94.7%)	0.332
Running a code	12	18.20%	25	21.00%	37 (20.0%)	0.645

**Table 4:** Number of residents who feel comfortable handling different issues during call categorized by post graduate year.

**Valid N:**

N=190 for the following residency calls: Hyperglycemia/Hypoglycemia, Oxygen desaturation, Abdominal pain, Dysuria/Hematuria, Headache, Seizure and Altered mental status.

Constipation (N=189)

Insomnia (N=188)

Running a code (N=185)

Residency Call, n (%)	Prelim. Medicine 99 (51.8%)	Prelim. Surgery 14 (7.3%)	Transitional Year 78 (40.8%)	Total	P
				(N=191)	
Fever	96 (97.0%)	12 (85.7%)	72 (92.3%)	180 (94.2%)	0.09
Pain	97 (98.0%)	13 (92.9%)	74 (94.9%)	184 (96.3%)	0.3
Fall	92 (92.9%)	12 (85.7%)	72 (92.3%)	176 (92.2%)	0.64
Hyperglycemia/Hypoglycemia	83 (84.7%)	10 (71.4%)	59 (75.6%)	152 (80.0%)	0.23
Hypertensive urgency/Emergency	72 (72.7%)	10 (71.4%)	51 (65.4%)	133 (69.6%)	0.57
Hypotension	80 (80.8%)	9 (64.3%)	57 (73.1%)	146 (76.4%)	0.26
Chest pain	81 (81.8%)	9 (64.3%)	56 (71.8%)	146 (76.4%)	0.16
Arrhythmia	48 (48.5%)	3 (21.4%)	26 (33.3%)	77 (40.3%)	0.04
Shortness of breath	76 (76.8%)	10 (71.4%)	51 (65.4%)	137 (71.7%)	0.25
Oxygen desaturation	70 (71.4%)	9 (64.3%)	50 (64.1%)	129 (67.9%)	0.56
Abdominal pain	83 (83.8%)	11 (78.6%)	60 (77.9%)	154 (81.1%)	0.59
Constipation	99 (100%)	12 (92.3%)	74 (96.1%)	185 (97.9%)	0.04
GI bleed	64 (64.7%)	7 (50.0%)	45 (57.7%)	116 (60.7%)	0.45
Dysuria/Hematuria	84 (84.9%)	8 (57.1%)	61 (79.2%)	153 (80.5%)	0.05
Headache	92 (93.9%)	11 (78.6%)	70 (89.7%)	173 (91.1%)	0.15
Seizure	48 (49.0%)	5 (35.7%)	33 (42.3%)	86 (45.3%)	0.51
Altered mental status	74 (75.5%)	8 (57.1%)	56 (71.8%)	138 (72.6%)	0.35
Agitation/Combative	68 (68.7%)	9 (64.3%)	51 (65.4%)	128 (67.0%)	0.88
Insomnia	93 (94.9%)	11 (84.6%)	73 (94.8%)	177 (94.2%)	0.29
Running a code	20 (20.6%)	5 (38.5%)	13 (17.3%)	38 (20.5%)	0.21

**Table 5:** Number of residents who feel comfortable handling different issues during call categorized by type of preliminary training year.

**Note:** P-values that were calculated using Fisher’s and Pearson’s Chi-Square test, accordingly.

**Valid N:**

N=190 for the following residency calls: Hyperglycemia/Hypoglycemia, Oxygen desaturation, Dysuria/Hematuria, Headache, Seizure and Altered mental status.

Constipation (N=189)

Insomnia (N=188)

Running a code (N=185)

It is important to note that the top issues reported were in response to a free response question and not by observation. An observational study reviewing home call in a PM&R residency showed that the top reasons for getting paged were new onset of symptoms, new lab values, general issues, and bowel/bladder [2]. Insomnia, pain, change in vital signs and falls were less frequent reasons for pages (<10%). This does not coincide with the data found in our study, however the observational study was done over a short period of time of 3 months and involved just 6 participants.

There have been different strategies suggested to improve the quality of call for residents. Harvey et al., suggested placing standard orders for bowel care as well as insomnia when a patient is admitted [3]. As bowel issues and insomnia were amongst the top five reasons PM&R residents were getting paged during call, standard orders upon admission would likely reduce the number of calls. Pain was the number one reason reported on the survey for why residents were being paged. As well as standard orders for bowel care and insomnia, implementing pain medications ahead of time could also reduce the number of unnecessary overnight pages. This would improve patient care as it would avoid any delays in getting medications to patients. Goldsmith and Melvin suggested incorporating “safety rounds” during didactics which entails 30 minute sessions every month to discuss on-call issues experienced by residents. The goal of this exercise was to learn from the experiences of others [4]. Another study looked at role playing

among residents and fellows using common problems encountered while on home call for nursing homes. After this exercise, there was improvement in overall attitude and skills amongst residents and fellows, including comfort level in management of common problems [5]. Implementation of these strategies into PM&R residencies may improve the comfort level and preparedness for issues not commonly experienced by residents routinely during call.

**Study Limitations**

Although there are significant findings in our study, there are several limitations. First, this was a survey study and information was collected through recall by the participants. Especially when looking at the top items for which residents were getting paged, there was no objective data collected as was done in prior studies in which residents were logging the specific reasons for which they were getting paged [2,3]. Secondly, as this was a survey study, not all participants answered the free response questions appropriately. Additionally, there was a discrepancy across some programs in regards to the type of call taken at their institution. Lastly, the analysis was underpowered in terms of comfortability across type of preliminary training program, specifically in preliminary surgery. If a repeat study was done, a larger sample size of those who were trained in surgery would be ideal.

A strength of the study was the number of responses to the survey. The data collected was able to generate enough data to ensure statistical

value for certain measures. There was good geographic representation as responses were across 25 US states and territories including Puerto Rico. Also, there was similar representation across PGY-levels except for PGY-1 which is as expected as not all PM&R programs are categorical.

Future studies should include a comparison study with pre and post surveys after implementing some of the above mentioned strategies to improve the quality of residency call. It would also be interesting to look at the average hours of sleep in programs that have in-house call versus home call.

## Conclusion

In conclusion, to our knowledge our study is the first nationwide survey of PM&R programs that investigated how comfortable residents feel during call as well as what residents are being paged about during call. The information found in this study can be used to better guide PM&R residency programs in the focus of their educational conferences, especially in the beginning of the year when new residents are being transitioned into taking PM&R call for the first time. The information can also help improve the quality of call through better resident preparation to ultimately improve patient care. Additionally, it can provide information for future PM&R residents in choosing a preliminary year that may better prepare them for call.

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