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The impact of advanced practice providers on the surgical resident experience: Agree to disagree?

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ABSTRACT

Background: We examined and compared APP versus surgical resident perceptions of the role of APPs in surgical subspecialty teams.
Methods: Residents/first year surgical critical care fellows and inpatient service-specific APPs responded to a survey that examined perceptions about the APP-resident/fellow relationship. Statistical analysis compared responses using a Pearson chi-square test.
Results: Thirty-two resident/fellows (48%) and 10 APPs (42%) responded. There was consensus that having an APP on service decreases workload, contributes to continuity of care and enhances resident-patient coordination education and agreement that there was clear communication and adequate collaboration. Both groups differed with respect to APPs contribution to resident/fellow clinical education, role definition and chain of command. The majority of trainees felt that APPs function at a PGY2 level (51.7%) compared to APPs, who felt that they functioned at a PGY4/5 (22%) or Fellow (44%) level.
Conclusion: APPs and resident/fellows agree that APPs impact resident workload, continuity of care and patient-coordination education.

Introduction

The Accreditation Council for Graduate Medical Education (ACGME) 80-h work-week restrictions, implemented in 2003, resulted in a shortage of resident physician coverage and the need for a long-term, safe and viable solution. This fueled the integration of service-based Nurse Practitioners and Physician Assistants (collectively referred to as Advanced Practice Providers or APPs) into trauma and surgical subspecialty teams.[1–3] APPs, already widely utilized in the acute care setting, were a qualified and dependable solution to the problem of decreased provider coverage.[2,4–6] The contribution of the APP in the multidisciplinary team has been demonstrated to improve length of stay, provide continuity of care, reduce costs, and promote quality and safety.[2,7–9] In addition, a synthesis of evidence from Australia, Canada, New Zealand, United Kingdom and United States suggests that APPs in emergency and critical care practice have clinical outcomes comparable to those of physicians.[10] Although current evidence suggests a benefit to integration of the APP within the surgical and trauma team model,[7–9,11–13] the APP impact on surgical resident training and education remains unclear.

In academic medical centers, APPs have the opportunity to enhance and contribute to surgical resident and fellow education. They are suitably poised to foster collaborative relationships with residents and provide beneficial guidance and learning opportunities.[14] The addition of APPs to trauma and surgical services has been demonstrated to reduce resident workload and work hours, increase sleep time and increase resident time spent in the operating room.[8,13,15–17] Furthermore, recent surveys suggest that residents value time for learning opportunities and cite the availability of APPs as a factor in reducing their clinical workload.[15,16] The academic dynamic between residents and APPs is constantly evolving and has yet to be explored in depth. Our objective is to compare APP versus resident and surgical critical care fellow perceptions regarding the role APPs in surgical subspecialty teams have with respect to communication, resident workload and education. We

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hypothesized that surgical residents and critical care fellows would perceive the contributions of the APP in an overall positive manner.

Methods

After obtaining IRB approval, an anonymous, voluntary electronic survey was distributed to all surgical residents (n = 58), first year surgical critical care fellows (n = 8) and inpatient surgery service-specific APPs (n = 24) at an urban tertiary referral center. The survey was distributed at the completion of academic year 2016–2017. A 5-point Likert scale was used with responses ranging from "strongly disagree" to "strongly agree". Space was provided for open-ended comments. The survey examined perceptions about the APP-resident relationship in regards to education, continuity of care, communication, collaboration, role transparency and hierarchy. The survey questions with respect to these themes were identical between both groups. Statistical analysis compared all available resident and APP responses using a Pearson chi-square test. In addition, each group was asked about the perceived level at which the APP functions. Responses were grouped into 3 categories: demographics, APP and resident responses to Likert scale questions, and APP and resident perception of APP level of function.

Resident/surgical critical care fellow survey

In the 2016/2017 academic year there were 63 surgical residents and 8 surgical critical care fellows. Interns who did not rotate through all surgical sub-specialties were not included in the survey (n = 5). Thus, the survey was distributed to 58 surgical residents and 8 surgical critical care fellows (n = 66). Residents and fellows were asked to consider their experience while rotating on surgical services that employed service-specific APPs (Trauma, Emergency General Surgery, Transplant, Vascular and Pediatric Surgery). The surgical residency is structured as a 7-year program, with 2 years of required research after the 2nd year. Research residents were included in the survey and were asked to reflect on their most recent clinical year. Postgraduate Year (PGY) 1, PGY2 and critical care fellow rotations are 4 weeks; PGY 3 rotations are 4–6 weeks; and PGY 4/5 rotations are 8 weeks. Residents provide 24/7 coverage with some cross-coverage of services on nights and weekends. A chief or fellow provides either in-house or home call on nights and weekends.

APP survey

A similar survey was concurrently administered to 24 service-based APPs, which included both Nurse Practitioners (NP) and Physician Assistants (PA). The Trauma, Emergency General Surgery, Transplant, Vascular and Pediatric Surgery services all employ APPs and they do not rotate between services or cross-cover. Coverage occurs Monday thru Friday with either 10 or 12 h shifts on all services, with Transplant and Trauma also having daytime weekend coverage. The specific responsibility of the APPs includes admission history and physicals, performing surgical consultations, perioperative management, and discharge planning. Depending on the service, the APP may also assist in bedside and operating room procedures and staff out-patient clinics. All APPs round with attending physicians and residents, although the chain of command differs by service.

Results

Ten APPs (42%) and thirty-two resident/fellows (48%) completed the survey. Of the APP respondents, 100% (10) were female and the majority had less than 2 years of advanced practice experience. The sex of the resident respondents had equal distribution, and the majority of respondents were PGY2 (31%, n = 10) followed by PGY 1 and 5 each at 18% (n = 6). Resident respondents were evenly split by sex (Table 1).

Resident and APP responses to like questions regarding education, APP role and communication are summarized in Table 2. Questions pertaining to resident education are divided into "clinical education" which refers to clinical or operative/procedural skills, and "patient coordination education" which refers to activities such as discharge coordination, medication reconciliation, and administrative duties. Responses are grouped into two categories: always/usually and sometimes/rarely/never. Resident open-ended responses revealed several emerging themes: education, communication, APP impact on patient care, APP clinical knowledge and APP role definition. The APP respondents did not provide any open-ended comments.

Education

There was agreement between both groups that APPs contributed to *patient coordination* education (77% of APPs and 89.7% of residents, p = 0.36). Conversely, there was disagreement between the perception of APP contribution to resident *clinical* education, where only 31% of residents felt that APPs contributed, compared to 77.8% of APPs (p = 0.01). The open-ended resident comments highlight this perception:

> *"APPs are more likely to take care of the day-to-day details of something such as care coordination that the residents most likely are not interested in doing much of the time, but which are crucial skills to have in caring for patients, In effect since the APPs take care of these details, residents/fellows have no need to know these intricacies."*

> *"It depends on how the APP views oneself and the role on the healthcare team. If the APP is acting as a "physician assistant" or "physician extender", then these APPs nearly always enhance resident education because that APP is willing to perform paperwork or relatively routine/mundane tasks so surgical residents can get into the OR, perform bedside procedures, or perform other critical thinking patient care tasks such as new consults/admissions/difficult patient management."*

Table 1
Participant demographics.

APP		(n = 10)
Male	0	(0.0%)
Female	10	(100.0%)
NP	7	(70.0%)
PA	3	(30.0%)
Years of experience		
<2	4	(44.4%)
2-5	2	(22.2%)
6-10	2	(22.2%)
11-15	0	(0.0%)
>15	1	(11.1%)
Residents		(n = 32)
Male	16	(50.0%)
Female	16	(50.0%)
Year of Residency		
1st	6	(18.8%)
2nd	10	(31.3%)
3rd	1	(3.1%)
4th	3	(9.4%)
5th	6	(18.8%)
Fellow	6	(18.8%)

Table 2
APP and Resident responses.

Survey question	Always/usually		Sometimes/rarely/never		p-value
	APP	Resident/fellow	APP	Resident/fellow	
Education					
Do you feel that APPs contribute to resident clinical education (i.e. clinical skills)?	77.8	31.0	22.2	68.9	0.01
Do you feel that APPs contribute to resident patient coordination education (i.e. discharge coordination)?	77.8	89.7	22.2	10.3	0.36
Do you feel that APPs contribute to fellow education?	44.4	26.3	55.6	73.7	0.34
Do you feel that residents contribute to APP education?	25.0	28.6	75.0	71.4	0.84
Do you feel that fellows contribute to APP education?	66.7	45.5	33.3	54.5	0.28
Roles and communication					
Do you feel that having an APP on service decreases resident/fellow workload?	100.0	72.4	0.0	27.6	0.12
Do you feel that having an APP on service contributes to continuity of care?	100.0	82.8	0.0	17.2	0.18
Is the APP role well defined? (Do you clearly understand the role or the job the APP is supposed to be doing?)	100.0	34.5	0.0	65.5	<0.01
Do you feel that the "chain of command" within the service is well established?	77.8	34.5	22.2	65.5	0.02
Do you feel that there is clear communication between resident and APP with regards to patient care?	77.8	60.7	22.2	39.3	0.35
Do you feel that there is clear communication between fellow and APP with regards to patient care?	88.9	61.1	11.1	38.9	0.14
Do you feel that there is adequate collaboration between resident and APP with regards to patient care?	66.7	70.4	33.3	29.6	0.83
Do you feel that there is adequate collaboration between fellow and APP with regards to patient care?	66.7	61.9	33.3	38.1	0.80

The responses to whether residents contribute to APP education suggested a different dynamic. Both groups agreed that residents do not contribute significantly to APP education (25% of APPs and 28.6% of residents, $p = 0.84$). On the other hand, 66% of APPs did agree that critical care fellows contributed to their education.

Roles and communication

Resident/fellows and APPs at our institution agreed that having an APP on service decreases workload (72.4% and 100%, respectively, $p = 0.12$), and contributes to continuity of care (82.8% and 100%, $p = 0.18$). A majority of residents and APPs also felt that there was clear communication (60.7% and 77.8%, $p = 0.35$) and adequate collaboration (70.4% and 66.7%, $p = 0.83$) between house staff and APPs regarding patient care. Fellows and APPs also felt that there was clear communication (61.1% and 88.9%, $p = 0.14$) and adequate collaboration (61.9% and 66.7%, $p = 0.80$) between groups. The open-ended resident responses suggest appreciation for the role the APP has in care coordination:

> *"I think APPs are invaluable in coordinating patient care and appropriate transition of care from the inpatient to the outpatient setting (e.g. rehab, home, hospice) and in ensuring timely follow up"*

> *"… having APPs on a service is a great benefit to all residents and patients, especially with discharge coordination, continuity of care, knowledge of attending preferences/standard of care and approach to commonly encountered diagnoses, consults, and post op patients, etc."*

The role of the APP and where they fit within the team was another point of disagreement. Significantly more APPs than resident/fellows felt that APP roles were well-defined (100% vs. 34.5%, $p = 0.01$) and that the "chain of command" was well-established (77.8% vs. 34.5%, $p = 0.02$). The ambiguity of the APPs responsibilities emerged as a theme and is highlighted in these open-ended resident responses:

> *"Is the APP role to perform any tasks a physician is able to do? I would strongly argue if that is the goal of any APP, then that individual needs to pursue medical school … it's extremely challenging path, rigorous training, and oath to care for patients more than a few days a week for most of a work day."*

> *"… what is the role of the APP? What is the role of the resident physician? I think in order to maximize team work, these roles need to be clearly defined and the hierarchy needs to be clearly delineated, and I propose that the APP should never under any circumstance be considered to function higher than the level of a PGY2 surgical resident."*

> *"Is the APP role well defined – yes, but the better question is if the role is defined in the best way possible? The APP is very helpful with discharge work and continuity of care as they are on the service all the time. However this makes the residents always the 'new' ones. Frequently it is the APPs job to tell residents what their role is. Because the APPS are so helpful and the teams rely on them, there is incentive at all levels not to make waves. The APPs are also involved in resident education on some services. Thus, especially for the non-chief resident, the APP can take a pseudo-chief/attending role (i.e. they dictate what the resident should do and sometimes what they are 'allowed to do)'. It's hard under these circumstances for a resident to speak up or advocate for themselves."*

APP level of function

Resident/fellows and APPs also diverge with respect to the level at which the APP functions (Table 3). The majority of residents felt that APPs function at a PGY2 level (51.7%) compared to APPs, who felt that they functioned at a PGY4/5 (22%) or Fellow (44%) level. None of the residents considered APPs functioning higher than PGY4/5. Open-ended resident responses further highlight this uncertainty:

> *"APPs and their contributions are variable. Some are great, but others have poor clinical skills and work ethic, which is detrimental to a surgical team and resident education."*

> *"There is a very wide spectrum of APP experience and clinical knowledge. Some function closer to PGY3/4 level and some function lower than a PGY1 level. I think there can be a false sense of confidence/misunderstanding of "chain of command" with less experienced APPs (who may expect to be treated closer to a chief or attending despite very little clinical experience), which can be dangerous."*

Table 3
Perception of APP level of function.

At what level do you feel the APP most closely functions	Response	APP (n)	Resident (n)
	PGY1	0.0 (0)	17.2 (5)
	PGY2	11.11 (1)	51.7 (15)
	PGY3	11.11 (1)	24.1 (7)
	PGY4/5	22.22 (2)	6.0 (2)
	Fellow	44.44 (4)	0.0 (0)
	Attending	11.11 (1)	0.0 (0)

Discussion

Our findings suggest the addition of APPs to surgical subspecialty services improves continuity of care, decreases resident workload and enhances resident education with respect to patient care coordination. Nevertheless, there are potential areas of improvement pertaining to the APPs role in resident clinical education and vice versa. The resident responses suggested less perceived value with respect to APPs impact on their clinical education. This could suggest a disparity in the recognized benefit of education regarding clinical activities versus care coordination activities, where surgical residents consider operating room time or performing procedures to have the greatest impact on their training. This perception was also echoed in response to the question of whether residents impacted APP education – both groups agreed they did not. It is unclear whether this is because both groups feel that APPs expertise with respect to care coordination practices is grounded and in little need for enhancement, or because both feel that APP education isn't enhanced with procedural or surgical training. The merit of multidisciplinary communication, discharge planning, follow up care and administrative tasks is well established and is considered a hallmark of the APPs practice.[1,10] Open-ended resident responses suggested recognition of APP expertise in these areas and acknowledgement that shifting these patient care coordination activities to the APP affords them more time in the operating room. Thus, it could be concluded that there is a disparity between perceived usefulness of care coordination education versus clinical education among residents. The unfortunate result is a lack of resident training in the actual process of patient care. A recent multi-institution survey suggests that faculty harbor concerns that APPs management of workload detracts from resident exposure to basic day-to-day patient care activities.[18] It is therefore possible that easing resident workload negatively impacts exposure to routine, but nonetheless crucial, aspects of bedside care. Perhaps the APP impact on surgical resident education is considered more valuable when it allows for increased participation in the operating room. In our institution, there are select services that utilize APPs in the OR, but APPs may not be using that as an opportunity for resident education. Furthermore, residents may be under the impression that APPs are present to help with patient care, but are not an education resource. The consequence of this dichotomy is fractured team-based collaboration and decreased resident exposure to all aspects of patient care. Thus, further clarification regarding exactly how the APP should impact resident education is needed. Fostering team dynamics and creating a model of shared accountability between APPs and resident will avoid division of tasks and responsibilities.[19] Faculty acknowledgement regarding the importance of resident familiarity with all aspects of patient care can also be influential. The objective should be to stimulate a learning environment that cultivates a multi-faceted approach to patient care. These actions would promote a culture that acknowledges the significance of collaboration, evidence-based practice and outcomes.

A salient takeaway and emerging theme is the surgical resident's uncertainty concerning the specific role of the APP and their position in the traditional surgical hierarchy. The lack of clarity with respect to level of function and role definition could be rooted in the much-cited rationale for increasing the APP workforce in the acute care setting: resident work hour restrictions.[3,7,9,12,20] Consequently, it is difficult not to think of APPs as “resident replacements”. Out-dated monikers such as “physician extender” or “mid-level provider” have validated this function. When the professions were conceived over 50 years ago, it was to counter a growing imbalance of physician to patient ratios and address the need for primary care in rural areas. More recently, the resident work hour restriction and subsequent impact on in-hospital patient care and staffing provided the momentum to increase the APP workforce in the acute care, trauma and critical care settings. Due to variable practice between individual service lines, units and institutions, the role of the APP and their distinction from physician providers could contribute to this uncertainty. Individual surgical services are also specialized in such a way that the constant presence of an APP qualifies them as “expert” with respect to that specific patient population. Variability in practice and level of function also correlates with years of experience. A novice APP should not be expected to function at the same level as an experienced resident in the same way a first year resident wouldn't function at the level of a 4th or 5th year resident. To some degree, our findings suggest that the APP is viewed as both a mentor and as a subordinate depending on the circumstance. The traditional sentiment that the role of the APP is to off-load resident work burden or perform as a substitute for physician providers cannot be sustained within a modern and advanced healthcare system. Viewing the APP as a colleague and educator rather than a surrogate to the resident honors their unique skills and will ameliorate role confusion. Further actions should include resident education with regards to APP education, preparation and competency and clear delineation of responsibilities. It is also recommended that clarity regarding the expectation that APPs report directly to faculty and not residents be supporting by physician supervisors.[21]

Although the survey responses provided insightful, there are several limitations to this study. The first is the heterogeneity and small sample size of the APP group. With that in mind, a second limitation is the small sample size of PAs specifically. The PA education curriculum inherently includes more procedure and operative training and their perspective on influence of resident education would have been valuable. Lastly, the absence of APP open-ended statements impacts the ability to compare the groups on a more informal and personal level. This is solely due to respondent preference, as there was space provided for comments.

Further research evaluating the influence of surgical subspecialty APPs on resident education at a multi-institution level is needed. Moreover, specific studies examining the role of the APP and their function within a team or service are essential. Closer examination of variations in APP practice and integration within the surgical hierarchy would provide methods for optimizing the role. Lastly, evaluating team structure and practice between organizations with respect to outcomes and cost would contribute to

actualization of best-practice.

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