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Time Pressure Experienced by Internal Medicine Residents in an Educational Hospital in Saudi Arabia: A Qualitative Study

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Abstract

Purpose: Residents suffer from high workload and extended working hours, which have several negative consequences on their mental health and patients' safety. Similarly, time pressure, which is also part of the clinical training of medical residents, may have adverse effects on their performance. The aim of this study was to explore internal medicine residents' perceptions of time pressure sources in the workplace, its negative effects on them and their patients and finally what strategies they adopt to cope with them.

Method: This was a focus group qualitative study. Seventeen internal medicine residents from all four years of the residency training were recruited. A semi-structured interview approach was used, and data were analyzed using thematic analysis.

Results: Participants perceived their work as stressful and very demanding. Four major themes emerged to explain the sources of time pressure in the workplace: patient-related factors; practice-related factors; training-related factors; and resident-related factors. In addition, two main themes arose to show the negative effects of time pressure on residents: the effects on residents' health and the effects on residents' performance. Data also showed two main coping strategies, which can be summarized as: active adaptive coping and avoidant maladaptive coping.

Discussion: This in-depth-qualitative study highlights the sources and consequences of perceived time pressure in clinical training of internal medicine residents. Residents feel this adverse working condition could have substantial adverse effects on their health and performance.

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Keywords: Residents; Time pressure; Stress; Internal medicine; Clinical training

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1. Introduction

Medical residents face many challenges during their training. These challenges include long working hours, high workload, stress, sleep deprivation, fatigue, exhaustion, burnout, and work-life imbalance.^{1–4}

Particularly in internal medicine, residents spend long working hours in the workplace and face excessive demands.⁵ They have to deal with many patients during their long shifts and as a consequence often experience stress and time pressure to get the job done. These stressful situations are expected to exert negative effects on residents' psychological and physical status. Martini and colleagues found that residents who worked more than 80 h a week had higher rates of burnout (69.2%) compared with a burnout rate of 38.5% after reducing their work hours.⁶ Similarly, another study showed that working more than 80 h per week is linked to higher rates of occupational stress among residents.⁵ In another study, Rosen et al. investigated the residents' change in depression, sleep deprivation, burnout, and empathy during the 1st year of internal medicine residency.⁷ Authors found an increase in the chronic sleep deprivation, depression, and burnout and a decrease in empathy levels from the baseline to the end of the year. These results suggested that throughout the first year of residency, high work demands adversely affected the psychological well-being of residents.

Besides the strains on residents' physical and psychological well-being, these adverse working conditions may as well have detrimental effects on patient safety. For instance, a resident who experiences high workload under time pressure and is fatigued may be prone to commit medical errors.^{8,9} This may particularly apply to junior residents with less experience. Indeed, there are some studies that reported residents to admit that stressful working conditions and time pressure resulted in suboptimal patient care, increased medical errors, and cognitive impairments related to clinical judgment.^{10–13} A three-year longitudinal study examined the frequency of self-reported medical errors made by the internal medicine residents¹⁴ and found that 34% of residents reported making at least one major medical error throughout the course of the study. Perceived medical errors were associated with higher levels of burnout, higher levels of depression, and reduced quality of life. Another prospective study surveyed 380 internal medicine residents during their training from 2003 to 2008.⁸ The findings showed that 39% of residents made at least one major medical error during the study period, which was found to be significantly associated with fatigue and sleepiness during work.

Besides fatigue and long working hours being significant factors that resulted in medical errors, it is not clear whether high workload and time pressure have similarly negative effects resulting in medical errors. In

addition, since these studies tend to only focus on a narrow band of residents—mostly junior residents in the first year—it is currently not clear if these stressful working conditions have a similarly decremental effect on more senior residents. It is possible that more experienced residents are able to apply more effective coping strategies when under excessive workload and time pressure.

Coping strategies have been grouped into active and avoidant strategies. Active coping includes positive adaptation to the situation by modifying the stressor or the way of thinking about it while the avoidant coping strategies are negative adaptations to situations, such as denial, self-blame and alcohol/drugs use.¹⁵ It is important to understand how the residents are coping with time pressure during their work, as the type of coping strategies mediates the negative effects of time pressure on residents.¹⁶ It has been shown that avoidant coping is linked to depression, burnout, and reduced work performance.^{17–19}

In summary, it is known that residents experience a variety of work-place related challenges, such as long working hours, high work-load, time pressure, sleep deprivation, fatigue and burnout. It is however not clear how these detrimental factors result in medical errors, such as wrong prescribing of medication or diagnostic errors. It appears from the existing literature that time pressure is a prime candidate for causing diagnostic errors, because when under time pressure residents spent less time dealing with a patient which may make them rush to conclusions potentially without considering and processing all relevant factors.^{9,11} This may apply even more to junior residents since they lack the necessary expertise to rely on previous encounters with similar patients and thus need more time for processing all the relevant information. From the current literature it is also not clear how residents cope with these challenges and whether there are differences in coping strategies/behaviors between junior and more senior residents.

In light of the above limitations, the objective of the present study was to shed more light on the issue of perceived workplace time pressure by conducting a focus group study with internal medicine residents. Seventeen residents from all four years of the residency training participated in the study. To our best knowledge this is a first attempt to include all levels of residency training, which is expected to paint a more representative picture of the time pressure sources at different stages of their training are facing. In addition, we tried to explore what the negative effects of time pressure for the residents' psychological well-being

and patient safety and finally how they attempt to cope with them.

2. Method

2.1. Participants

All residents rotating in Internal Medicine Program in King Khalid University Hospital (KKUH), Riyadh, Saudi Arabia were eligible for the study. The internal medicine training program in KKUH is composed of four years of training where residents are exposed to variety of clinical cases in internal medicine by rotating in different departments such as cardiology, critical care medicine and gastroenterology.

In total, 17 residents participated in the study. Their mean age was 26.5 years (SD = 1.12), and gender was distributed as follows: 10 male and 7 female. See Table 1 for an overview and bread down of the four groups.

The residents were divided into four groups according to their level of experience: Residency level 1 (R1); Residency level 2 (R2); Residency level 3 (R3); and Residency level 4 (R4). The institutional review board of the National Guard Health Affairs, Riyadh, Saudi Arabia approved the study (RC10/122).

2.2. Procedure

Four focus groups were conducted, each focus group represents one level of training and comprised of 3–5 participants. Interviews were conducted in the same hospital over four weeks, with one group each week. Each group was interviewed before the beginning of their weekly teaching activity. Participants received no financial incentives for participation.

A semi-structured approach was adopted for the interviews. See Table 2 for the interview guide with the questions the interviewer asked the participants. The guide consisted of six questions and was pilot tested and amended by two internal medicine residents prior to the study.

Table 1
Profile of the focus groups participated in the study.

Group	Residency level	Number of participants	Gender
FG 1	Year 1	5	3 males, 2 females
FG 2	Year 2	5	3 males, 2 females
FG 3	Year 3	4	2 males, 2 females
FG 4	Year 4	3	2 males, 1 female

Note: FG, focus group.

Table 2
Interview guide.

Questions 1,2

1. Can you describe the intensity of your workload working hours, number of patients, cases characteristics)?

Prompt: Can you describe atypical working day/ week?

Probe: How do you feel about your work time pressure?

2. What do you think the factors that influence the time pressure during your clinical work?

Prompt: Do you think cases difficulty, cases number and personal factors increase time pressure?

Questions 3,4

3. Do you think time pressure has any effects on patient care?

Prompt: Are those effects positive or negative?

Probe: give examples?

4. Do you think there is a relation between time pressure and diagnostic errors?

Prompt: (How this relationship operates? examples from your practice, if any?!)

Probe: Do you think experience affects diagnostic errors? and why?

Question 5

5. How do you adapt to time pressure?

Prompt: Suggest ways that may help physicians to face time pressure in clinical practice?

Probe: Do you think educational activities might help physicians to adapt to time pressure?

Closure

Is there anything else you want to mention about time pressure in medical practice?

The interviews begun with a brief introduction, presenting the aim of the study and the objective of the interview. All participants signed the informed consent form and gave the permission for audio recording of the interviews. Participants were encouraged to express their opinions and deeply explore the underlining causes of time pressure in the workplace, its negative consequences and strategies for coping with it. The average duration of the interviews was 37 min (ranging from 30 to 60 min). The main researcher (AD)

conducted the interviews and guided the discussion, and a researcher (AA) observed the interviews and took notes.

2.3. Analysis

All interviews were transcribed verbatim and anonymized by AA. Then checked for accuracy by AD and MM. Data were imported into ATLAS.ti 8 Mac, a qualitative data analysis software, for data management and analysis. To analyze the data, verbatim transcripts were coded and thematic analysis was applied based on the model described by Braun and Clarke.²⁰ Coding started with initial open coding where each sentence in the transcript was read and coded line by line. Then followed by axial and focus coding to find the closely related codes and identify common categories and interrelationships. Emerging themes, subthemes, and key issues were identified and recorded. Then the findings were drafted, debated between authors and then finalized.

3. Results

The results of the focus-group discussions will be presented in the following order. First, residents' perceptions of the main sources of time pressure in their workplace will be presented. This will be followed by presenting the negative effects of perceived time pressure on their psychological and physiological well-being and their performance. Finally, it will be discussed how residents' cope with these challenges in general and time pressure in particular. Citations are marked with resident training level (R1, R2, R3, R4) to help distinguish between the stage of training, participant number and sex (M/F). For easy comparison, we also refer to junior residents (R1 and R2) and senior residents (R3 and R4).

3.1. Main sources of time pressure in the workplace

Coding of the residents' transcripts resulted in four main themes that contained two subthemes each (see Table 3). The four main themes to explain the experienced time pressure by residents were: (1) Patient-related factors; (2) Practice-related factors; (3) Training-related factors; and (4) Resident-related factors. The findings gained for the main themes and their corresponding subthemes will be presented in the next four sections.

3.1.1. Patient-related factors

The main sources of time pressure mentioned by the residents were the large number of patients they have to deal with and the level of complexity of the cases.

3.1.1.1. Subtheme: increased number of patients. 26.79% of the responses from the residents indicated that when the number of patients they had to see is high, they are more overwhelmed and feel time pressured. There was not large difference between junior residents (15.48%) and their senior counterparts (11.31%). See below for some representative responses:

'I totally agree with him, it depends on the rotation and number of patients, if too many patients it will be time consuming, we have to compromise something, if the rotation is light and the number of patients is few, I think we can take our time with every single patient.' (R1, P1, F)

'If you have fewer patients it will be less stressful and time pressure than heavier load.' (R2, P5, M)

'Load of patients. We used to have 23 patients. So, this might compromise some care. If we have a rotation with shortage of staff, sometimes you are the only resident and you're dealing with 10 patients.' (R4, P2, M)

Table 3
Sources of time pressure in medical practice as described by internal medicine residents.

Themes	Subthemes	Mentions (%)
1. Patient-related factors	a. Increased number of patients.	26.79% (15.48% J – 11.31%S)
	b. Case complexity.	11.31% (5.95% J – 5.36%S)
2. Practice-related factors	a. Working too many hours	14.29% (9.52% J – 4.76%S)
	b. Hospital system	11.31% (6.55% J – 4.76%S)
3. Training-related factors	a. Difficult consultants	13.10% (11.31% J – 1.79%S)
	b. Preparation for exams and educational activities	6.55% (2.98% J – 3.57%S)
4. Resident-related factors	a. Experience level	9.52% (4.17% J – 5.36%S)
	b. Roles and responsibilities	7.14% (1.19% J – 5.95%S)

Note: J refers to junior residents (R1 + R2) and S refers to senior residents (R3 + R4).

However, some participants also felt that the increased number of patients is dependent on the rotation subspecialty:

‘It depends on the clinical services because sometimes the services are heavier than the others and the opposite so for example: the cardiology, nephrology and GI (Gastrointestinal) the turnover of patients is quite a lot, it depends on the rotation but some other services such as for instance endocrinology, I know it’s relatively lighter.’ (R2, P4, M)

Moreover, some of the 1st year residents raised issues related to rotation organization as the reason they came under time pressure. For example, seeing many patients on their 1st day of the rotation without sufficient guidance:

‘For example, in my neurology rotation I handled like at start more than 10 patients by myself, so, I ended up staying up to 6 or 7 PM every day for the first week.’ (R1, P4, M)

‘Always the 1st day of the rotation, is the most difficult day.’ (R1, P5, M)

Shortage of residents was also identified by some participants as a contributing factor to time pressure:

‘The factors that affect time pressure are the obvious thing, number of residents available, the patients at the floor and the difficulty of the cases.’ (R2, P3, M)

‘Also depends on the number of residents sometimes you are alone only on the floor with 12–15 patients.’ (R2, P4, M)

Moreover, some participants pointed out that the time of the year is a factor that lead to increased number of patients and associated time pressure. For example, during the summer, an increased number of consultants and residents take vacations, which increases the work schedule. While in winter, the number of patients increase due higher prevalence of diseases outbreaks, such as colds.

‘For summer months, July, August and September that’s usually it’s the worse throughout the year while the residents have a shortage, you have only one resident, the resident is asked to see six patients and every patient has a story.’ (R2, P4, M)

‘For example, in October, in November and December when there tends to be outbreaks of certain types of infections or certain types of illnesses that tends to happen during those times, our

workload is much heavier and we usually admit 9 to 10 patients a night.’ (R3, P3, F)

3.1.1.2. Subtheme: case complexity. Some residents expressed their frustration when they are facing difficult cases, since they are usually presented in a complicated manner that require time and effort. In total, 11.31% of the responses mentioned it, with again no substantial difference between junior (5.95%) and senior residents (5.36%).

‘As you know nephrology patients most of them are sick patients with end stage renal disease and some other comorbidities, so we faced the problems with these new patients with multiple issues, it was really difficult day, we finished that day almost at 8 or 9 PM’ (R1, P5, M)

‘Sometimes the cases are beyond your level’ (R2, P1, F)

In addition, complex cases that present urgent issues, require the full attention from the resident may deviate his/her attention from other patients and in that way result in more time pressure, as one of the participants indicated:

‘If the patient is very sick or having high blood pressure or some issues, we focus on that patient and forget about other patients, I think he will end up dying if we don’t not focus on him 100%.’ (R1, P4, M)

Contrary, some participants considered seeing straightforward cases as relaxed and enjoyable experience:

‘When you deal with straightforward and simple cases it’s really enjoyable and fun and observing the prognosis of it, unlike when you are dealing with one who just sick and sick every single day and there is nothing you can do.’

3.1.2. Practice-related factors

This theme captures practice-related factors, expressed by the residents, as source of their feeling of time pressure. The two subthemes that emerged were working too many hours and issues related to the hospital system. See [Table 3](#) for an overview.

3.1.2.1. Subtheme: working too many hours. 14.29% of the responses from the residents mentioned that sometimes they have to work for longer shifts, that they are on calls, or have to deal with extended working

hours, which made them feel time pressured and exhausted. Junior residents appeared to be most affected since their mentions were more than twice that of senior residents (9.52% vs. 4.76%). See below for some representative responses:

‘It’s not like at 4:15, it is the end of the day, we finish the work and we go home. No, we have to finish all the work even if we stay until 7 or 8 PM. At heavier rotation, we must finish the work and go home, we cannot just excuse our self.’ (R2, P2, F)

‘I think to certain degree, what happens in our institutions is that the time pressure happens mostly on our on-calls because by policy, we are required to see patients as soon as we are consulted. If you get multiple consults, we have the same time limit to be applied for three different cases that you have for one different case.’ (R3, P3, F)

Moreover, not only that the residents have to stay for long working hours, they also have to deal with unpredictability in their working schedules, which made them feel more under time pressure:

‘There is one another factor that will affect time pressure which is there is no fix time for the round, sometimes the attending does the round late like 2:30 or 3 PM with one hour before the ending time to finish everything, ... and that make us stay for late in the hospital like 5 or 6 PM and sometimes 7 PM which make us more vulnerable to make a mistake. In contrast if the round started earlier like 10 or 11 AM you going to have time to finish the work.’ (R2, P5, M)

3.1.2.2. Subtheme: hospital system. There was relatively large agreement among the junior and senior residents that the hospital system can be a source of time pressure when it is not functioning well. 11.31% mentioned it in their responses (6.55% junior residents and 4.76% senior residents). Some of the residents mentioned that the unclarity about the rules and regulations of hospital can confuse them and exert pressure on them during being on-call or working hours. As residents from R3 mentioned:

‘For me personally it’s not only the number of cases that I see during my working hours or on-call or the complexity of the cases. It’s mainly the unclear rules and criteria about admitting the patients. This is the major factor that contributes to our stress during on-call especially, and also our working hours.’ (P2, R3, M)

‘Yes, sometimes you are referred a case for example, from the ER. It’s not clear whether this patient should be admitted and to which service. So, we spend most of our time stressing about whether the patient should be admitted under our team or not. So, had there been any clear rules, that would have made our job much easier.’ (P2, R3, M)

In addition, delayed processes for patient care can cause considerable pressure and unnecessary delayed management for patients. They lengthen the patients’ stays in the hospital which put the healthcare system more under pressure:

‘I would like to add, maybe be the system of the hospital itself, sometimes delayed a process of getting done with stuff like radiologic investigations, lab investigation, interventional procedures. You have to do the order and ask the intern and discuss with the radiologist consultant and then he refuses it. It makes sense to take 2–5 min to accomplish it but you finish it in 3–4 hours to get that. I am doing thing it’s not my job as doctor.’ (R2, P3, M)

The miscommunication between departments in the hospital, which some participants mentioned, was also an issue of the hospital system that place residents under time pressure.

‘Handling some difficult cases sometimes require additional involvement of other teams, as well as your own. Sometimes we have other issues regarding delayed management of other departments which are sometimes out of someone’s control.’ (P1, R3, M)

‘There could be a miscommunication from the senior to the junior, or the junior to the consultant service. Maybe the system doesn’t get our orders through, so some orders are delayed or nurses don’t see it or drops out of the system.’ (R4, P3, F)

An additional factor that was identified by the participants was the use of paper-based, instead of electronic medical records, that put stress and time pressure on the residents, since the paper-based systems is less time efficient:

‘When I worked on an institute that is paper-based, I felt more time stressed because I usually have a specific rhythm to work that I lost, and because usually writing the full history by hand is time consuming, also some of us are more adaptive to computers and that is the 1st thing. The 2nd thing is

the availability of information, usually we have the consultations from other departments as soon as it is written while in the paper system, sometimes people will come and see the file is used by someone else, so they have to wait to finish to make their note. At the same time, you have difficulty with the hand writing and you don't know what he wrote.' (P1, R3, M)

Several participants also pointed to the importance of the team they are working with such as consultants, other residents, interns and nurses in reducing or increasing the stress:

'When you deal with nice team, nice fellow, nice seniors, nice nurses who are willing to do their job properly this will decrease the stress almost immediately.' (P1, R2, M)

'If you have uncooperative team members, difficult residents, not interested or frequent absences then you have to deal with workload, so it gets higher.' (R4, P3, F)

Working night hours was also a source of time pressure, particularly inside the ER, as the resident is the on-call physician to cover the emergency cases:

'... for me, handling the ER itself or the on-calls; the dayshift or the working hours where everyone is around, the consultant is around, is really different than during the night when you're the face of the whole department. You're the first one who is going to handle the patient, whether he is a critical or an easy case. Handling the ER, taking the decision, you will not have feasible imaging or lab works during the night these may be critical to your diagnosis. So you will have to wait till the morning and just take an impression of the clinical status that the patient is in. So, this is a stressful thing.' (R3, P4, F)

3.1.3. Training-related factors

This theme identified training-related factors of the internal medicine training program as sources of time pressure during their work. Residents mentioned handling difficult consultants, preparing for exams and educational activities as main sources of time pressure.

3.1.3.1. Subtheme: difficult consultants. Some residents stated that the manner the consultants deal with them is a source of time pressure. In total, 13.10% of the responses referred to difficult consultants. This was clearly more an issue for junior residents (11.31%) as

compared with senior residents (1.79%). See below for some representative responses:

'A senior setting unrealistic goal for me in training as junior, they expect me to see 3 to 4 new cases within an hour. These put me in more pressure.' (R2, P3, M)

'One more important thing, who are you working with, it is really, really important, someone you are working with wonderful attending, helpful, encouraging you. On the other hand, you have stressful attending, very stressful follow and registrar who are trying to make your life even harder.' (R2, P2, F)

'There are levels of stresses, dealing with difficult personalities, it's either a consultant or a team member that's just difficult to handle. Especially when you're senior and you have to deal with every situation that you have. Sometimes, the consultant would have strict personality that you would not cope with easily.' (R3, P4, F)

Some of the participants complained that some consultants are not good decision makers or are not available for them to help them in dealing with difficult cases:

'I think another factor is when the consultants are not that helpful or strong in decision making, so I think the stress is more on us. It affects our clinical day, how we make our decisions.' (R4, P3, F)

'Stressed because the fellow doesn't actually participate even the consultant was not around and I am the responsible for anything happen.' (R1, P2, F)

'And when you call the consultant he may or may not answer, and you will have to wait for him to wake up and make the decision whether to admit or discharge.' (R3, P4, F)

Other residents also complained that some rounds with consultants take a long time, which put them more under time pressure to finish the assigned tasks with their patients:

'Some of consultants will take long time in the round and after that they are asking us to do a lot of things.' (R1, P5, M).

3.1.3.2. Subtheme: preparation for exams and educational activities. A few residents highlighted that preparation for exams in their training program put them under stress and time pressure. This considered 6.55% of the responses (see Table 3) and there was no

substantial difference between junior and senior residents. See below for some of these responses:

‘It is really intense and sometimes you get overwhelmed with studying trying to compensate for grades and dealing with sick patients on the same time, so you need to have like a clear mind in order to function properly. It’s really difficult to describe how intensities are unless you are in the field.’ (R2, P2, F).

‘We also have the stress from the exams. I don’t think anyone said that. For me, my daily routine I would be enjoying my work taking my time in every case that I see. However, when I have an exam I feel pressured that I have to finish it fast or go study a little bit or be on time to go home and study some more for the exam.’ (R3, P4, F).

‘It varies throughout the year, some months especially before the exam we’ll be very, very stressful.’ (R2, P5, M).

However, it is not only the preparation for year-end exams, but also the academic requirements throughout the year that put the residents under continuous pressure as one of the participants mentioned:

‘For example, if I have a presentation to present, and I am required to learn as much as I can during the rotation that I have, if the rotation is four weeks and I have one or two presentations during that rotation, I am required to stop my daily study to focus on the presentation then I go back and I get stressed because I’m not doing my daily reading. At the end of the day, we are both trainees as well as lead physicians. Sometimes taking on both roles is a little bit difficult.’ (R3, P3, F).

3.1.4. Resident-related factors

This theme identified factors concerning the residents themselves as the source of time pressure during

their practice, such as their experience level, their role and responsibilities and personal factors.

3.1.4.1. Subtheme: experience level. A number of participants believed that their experience level and unfamiliarity with clinical cases, was a reason to feel time pressured and stressed when dealing with patients. About 7% of the responses contained references to the perceived level of experience. This was slightly higher for senior residents (4.05%) as compared with junior residents (2.99%). See Table 3 for an overview. What follows are some of these responses:

‘I was more stressed then about how to do and deal with everything. Seeing myself with the same cases now as a senior, I am much more relaxed. I know now how to deal with it as I have faced the cases before.’ (R4, P2, M)

‘I think, as mentioned, experience would affect time pressure. The more experienced person would have much tolerant to time pressure.’ (R4, P2, M)

‘One more strong issue that make us really stressed is the lack of information and lack of experience, especially in the on-calls.’ (R1, P5, M)

3.1.4.2. Subtheme: roles and responsibilities. Some of the residents, in particular senior residents, indicated that being a doctor is a responsibility and demands devotion and working for long hours for their patients. Slightly more than 7% (see Table 3) of the mentions contained references to this and that it sometimes places them under time pressure and stress. This was mentioned by substantially more senior residents (5.95%) as compared with junior residents (1.19%). Some of these responses are provided below:

‘The bigger responsibility that you have to shoulder, the more stress that you would feel.’ (R3, P2, M)

Table 4
Negative effects of time pressure on internal medicine residents.

Themes	Subthemes	Mentions
Effects on residents’ health	a. Stress	16.38% (6.03% J–10.34%S)
	b. Fatigue and sleep deprivation	6.90% (0.86% J–4.31%S)
	c. Personal life affected	7.76% (3.45% J–4.31%S)
Effects on residents’ performance	a. Suboptimal patient care	26.72% (18.10% J–8.62%S)
	b. Medical errors	24.14% (14.66% J–9.48%S)
	c. Cognitive impairments	18.10% (5.17% J–12.93%S)

Note: J refers to junior residents (R1 + R2) and S refers to senior residents (R3 + R4).

‘Being a doctor it’s not like working in another services, it is not like a paper when you put it on the desk and you come to finish it tomorrow. It is dealing with a patient’s life, you have to finish and do everything before you leave.’ (R2, P5, F)

The senior residents also mentioned that being seniors put them under pressure, because they have more responsibilities. In addition, they have to embrace multiple roles such as being a teacher, supervisor and role model:

‘I think the stress in senior years is much higher because being responsible, being on call, you are the most senior and you are the one taking the decision.’ (R4, P2, M)

‘Naturally, you want to be a good role model to juniors, you want to teach them, you want to make them feel welcome in the field and especially being a senior in General Medicine unit ... you are shaping them. Because your shortcomings reflect the whole bulk of medicine. They look at you more than yourself. They see you as the physician they aspire to be or what they don’t want to be. So that’s an emotional pressure, to be a role model and to teach them as well.’ (R3, P1, M)

3.2. The negative effects of working under time pressure

Besides identifying sources of time pressure in the workplace, the participants in our study provided detailed insights in the adverse effects of time pressure. Two main themes emerged, (1) the effects on residents’ health and (2) the effects on residents’ performance. For each of the main themes, three subthemes emerged. See Table 4 for a breakdown of subthemes.

3.2.1. Effects on residents’ health

This theme summarizes the negative consequences of time pressure on the residents’ quality of life and psychological well-being. In particular, factors like stress, fatigue, sleep deprivation were mentioned that affected their personal life.

3.2.1.1. Subtheme: stress. Working under time pressure can be a source of emotional stress. More than 16% of the responses contained mentions about stress when they were working extended hours, handling many patients and difficult cases. In particular senior residents mentioned to feel stressed (10.34%) as compared with

junior residents (6.03%). See Table 4 and the following quotes:

‘I think the stress all over the residency just goes up and down, it’s never been a stress free area. Depending on the rotation, stress become less or higher.’ (R4, P2, M)

‘For example, just yesterday I was covering the ER calls. Towards the end of my shift, I have 3 referrals at once so I needed to see them all and review them thoroughly in like at half an hour maximum so I can call my consultant and get a decision regarding admission or discharge. Luckily, it didn’t affect my patients but I think if it happens several times it can lead to exhaustion, feeling stress and it will produce errors for sure.’ (R3, P2, M)

‘I felt stressed because the fellow didn’t actually participate, even the consultant was not around and I am the responsible for anything happen.’ (R1, P2, F)

Some participants mentioned that residency should not be a stress-free period; residents need stressful situations where they can learn as much as possible and gain experience. However, there was general agreement that stress should be controlled and monitored:

‘I think residency should be a stressful program. It should be. If it is a stress-free program, then it’s a bad residency program. As a resident, you need to be stressed, you need to be on pressure because these are the things that will lead you to improve.’ (R4, P2, M) (chief resident)

‘the residency should be stressful. It should be stressful because you are dealing with people lives.’ (R4, P1, M)

3.2.1.2. Subtheme: fatigue and sleep deprivation.

Working long hours and under increased workload, made the residents feel overwhelmed and fatigued. Interestingly, their mentions for this subtheme was relatively low (6.90%) as compared to the other subthemes. However, the mentions were substantially higher for senior residents (6.03%) as compared to junior residents (merely 0.86% mentions). See below for some of the utterances:

‘There are on-calls where they are tiring and there are on-calls that are light, but if that type of on-call kept happening on a recurrent basis my stress levels

would be much higher and there would be much, much higher errors.’ (R3, P3, F).

The lack of sleep was also described by some of the participants as being the result of their day and night shifts. They reported an average of 4–5 h of sleep per day:

‘Usually we sleep late, average of 5 hours maximum.’ (R2, P2, F)

‘Sometimes you get sleep-deprived during specific kinds of rotations. So usually you try to sleep when you can.’ (R3, P1, M)

3.2.1.3. Subtheme: personal life affected. Finally, some of the residents were concerned that the increased time pressure during their work affected their personal life, such as family and friends. About 8% of the responses contained reference to it (see Table 4), without a substantial difference between junior and senior residents.

‘We must finish the work and go home. We cannot just excuse our self. Some time we have a plan and we have to cancel everything. We only manage our plans over the weekend. It’s stressful.’ (R2, P2, F)

‘It will affect your personal life no matter of your sleeping only but also affect personal life and personal relationships with your family, your friends, it will be affected.’ (R2, P5, M)

‘I had to compromise on my personal life so that I can be a good physician at the same time a chief resident.’ (R4, P2, M) (chief resident)

‘Sometimes you get off from work and you sleep and come back to work the next day and that is your social life for the time being.’ (R3, P1, M)

3.2.2. Effects on residents’ performance

The second theme that emerged describes the negative effects of time pressure on residents’ performance. In particular, how time pressure may negatively impact the quality of care given to patients. Our participants highlighted the following adverse effects: suboptimal patient care, medical errors and cognitive impairments.

3.2.2.1. Subtheme: suboptimal patient care. A large number of mentions (26.72%) by the residents suggest that they perceived their performance with patients as suboptimal when they are working under time pressure. This was mentioned substantially more by the junior residents (18.10%) as compared with the senior

residents (8.62%). For example, delaying admitting or discharging patients until the next shift as one participant prescribed:

‘like when you have 5 patients and you order to discharge them and you forgot to tell the patient to go home, or forgetting one step in the management’ (R3, P3, F).

Moreover, many participants complained rushing from one patient to the other without giving them sufficient time, which adversely impacted the quality of care provided:

‘I think time pressure has negative effect on me thus my performance will be less. The patient will not be receiving the full care.’ (R4, P1, M)

‘If we’re dealing with patient care, patient treatment or patient management as a whole, and we’re dealing with a large number, it would be stressful and hard for me accommodate them all.’ (R4, P3, F)

‘If I have less time I will focus on sick patient and less on stable patient and this in fact affect negatively on patient care because the next day I discover some errors in the stable patient which I have to do in the previous day.’ (R1, P5, M)

‘I think we did our best to give what they need from us, but definitely some of them did not get their optimal attention.’ (R1, P2, F)

‘It’s more of delaying in the management of the patient because of the time pressure.’ (R1, P1, F)

Participants also believed that when they are under time pressure they are less thorough in information seeking and examination of their patients:

‘Sometimes I don’t have time to do the assessment of the pain, so, I just prescribe paracetamol even if the pain is serious and need more investigation.’ (R2, P1, F)

‘Yes. We try to treat him as soon as possible and when he gets better we discharge him. I think we can interfere and control these things if we have more time.’ (R4, P1, M)

‘We might be exhausted and then by the end of the day, some patients that we didn’t see, we’d postpone until the next day because we think they’re not that critical’ (R4, P3, F)

3.2.2.2. Subtheme: medical errors. Similar to the previous subtheme, a large number of mentions

(24.14%) referred to medical errors. Again, this was mentioned substantially more among junior residents when compared with their senior counterparts (14.66 vs. 9.48%). In particular, time-constraint conditions appear to make them more prone to medical errors:

‘I think it all depends on the person, some people may use it as a drive to excel but to certain limits but after that point, it may consciously or subconsciously make errors.’ (R3, P1, M)

In addition, medication errors were mentioned by many participants, in light of prescribe inappropriate medication or give the wrong dose:

‘With time pressure we forgot to renew medication or check if the patient on the proper medication or not.’ (R1, P4, M)

‘Actually, the mistake was the previous resident forget to renew the heparin for more than 2 days because he was stressed almost with a lot of patients almost 7 patients, I handled this patient with DVT from the previous resident because he was overwhelmed, he is good but overwhelmed.’ (R1, P5, M)

Also, errors related to insufficient assessment of patient’s data was mentioned by the participants:

‘With time pressure, it may lead to that at the end of day might miss something trivial, something small because you are being pressured to finish. Something that would lead to a higher complication the next day.’ (R4, P2, M)

‘... because you are focusing on something you missed the tiny thing that turns out to be later as serious thing that should have been taken into consideration when the patient got in the hospital.’ (R2, P4, M)

3.2.2.3. Subtheme: cognitive impairments. Finally, a relatively large number of residents mentioned that time pressure diminished their diagnostic performance and threatened the quality of care provided to their patients (18.1%). By being disorganized and not able to carefully collect, analyze and diagnose their patients correctly as the following quotes exemplify. This was more an issue with the senior residents (12.93%) than with junior residents (5.17%):

‘Usually you just try to go the most common and the most dangerous or deadly diagnosis. If you can manage those and just keep your patient alive till

the morning, I would consider it a job well done.’ (R3, P1, M)

‘Yes, having limited time to review patient and see them thoroughly will affect your judgment.’ (R3, P2, M)

‘At the same time push you not to press an issue because you’re pressed for time. Sometimes you’ll not go for that second or third time to ask the patient that same question. When usually you have to get that final answer that might change the picture.’ (R3, P1, M)

‘... depending on time pressure and difficulty of cases or the consultant himself, all those factors will be stressors for us and make us confused, or unorganized and we cannot focus on each patient, so we may forget something (maybe something important) so it will end up by diagnostic errors or complication of the patient.’ (R1, P4, M)

Moreover, time pressure affected the reasoning process negatively, leading to insufficient hypothesis generation as some participants described:

‘When we deal with difficult cases with time pressure, this will affect how to deal totally with patient from A to Z, because you want to listen to the patient, you want to understand what the problem, you want to reach the diagnosis, to reach the management, and I have one hour with 3–4 patients (you will take the 1st two differential diagnosis.’ (R2, P1, F)

‘We missed simple things in the patient; we only focus on the big picture we don’t have time to take the details of the patient. We just take the big picture and then we carry the plan we don’t have our own plan as a resident only the consultant and the senior plan. That’s it when we carry on. We do not have the time to plan but only to carry it on.’ (R2, P2, F)

‘From my experience, I noticed that the shorter time I have, the less differential diagnosis. ... Common is common and that’s the rule to go by. At the end of the day, just keeping them alive is sometimes the only thing you can do.’ (R3, P3, F)

The negative cognitive effects of time pressure also extend to residents’ learning process from their clinical experiences:

‘When get physically abused your mind just shut up, you can’t think you are overwhelmed, tired and exhausted after a long day of going back and forth

to the patients to arrange images so you do not have time to read or learn about it.’ (R2, P1, F)

‘I have just 15 min to read about it and provide provisional and initial plan.’ (R2, P4, M)

3.3. Coping strategies with time pressure

The interview data obtained from our participants provided also insights in how residents cope with time pressure. Analysis of the data suggests that there are two main coping strategies, which can be summarized as: (1) active adaptive coping and (2) avoidant maladaptive coping.

3.3.1. Active adaptive coping

A large number of the responses (87.14%) referred to active adaptation strategies that were helping residents to enhance their performance while reducing time pressure. They mentioned that time management, supportive working environment, improving knowledge and skills, seeking social support, humor, accepting the reality, exercising and relaxation are helpful techniques. There were not big differences between junior and senior residents in the frequency with which these active adaptive coping strategies were mentioned (40% junior residents vs. 47.14% senior residents). Below are some representative quotes that included these coping strategies:

‘Making priorities in my work for each patient to finish the work and communicate with each other, stuff and nurses, and make sure they understand their patient, understand his job, so the work flow will go smoothly.’ (R1, P4, M)

‘Try to study more and get experience from my work and my seniors, second thing being happy because a lot of stress will make you depressed.’ (R1, P5, M)

‘At home, the family support makes a huge difference knowing that at the end of the day, your family is gonna be accepting of you no matter what you did at your work and how you feel and that they’ll accept you in whatever shape you come into the home with. That’s a huge, huge help. Also, yoga, deep breathing does a lot of help.’ (R3, P3, F)

‘Seeking support. Support comes from your own self resolve, your determination, also come from external sources like your family, your colleagues,

your friend, your seniors. The support of your seniors is very important.’ (R3, P2, M)

‘When you see the patient getting better, you would not mind the hours that you spent in the case or in the hospital.’ (R3, P4, F)

‘You need to be relaxed some people they are really affected by time pressure and they are very stressful and this stress make you more stressful and doing mistakes so, relaxing technique and just laughing with your colleagues and try to relax yourself, destress yourself it’s really important things that helping to adapt time pressure.’ (R2, P5, M)

‘Organizing is very important. You have to be organized. if you are coming and start your day without clear plan what going to do today it’s going to be time pressure for you.’ (R2, P5, M)

‘Another thing is the support of environment, sometimes a kind word being said to you or you saying it to someone else really does relieve a lot of pressure.’ (P3, p3, F)

3.3.2. Avoidant maladaptive coping

On the other hand, some participants described avoidant maladaptive strategies that do not improve their performance. These mentions were however much less than the mentions of the active adaptive coping strategies (total 12.86%; junior residents 7.14%, senior residents 5.71%). These avoidant maladaptive coping strategies temporarily alleviate the symptoms while the stressor (increased time pressure) maintains its strength or becomes even more stressful. Among the maladaptive strategies mentioned by the participants, self-distraction, like watching TV or movies, unhealthy eating habits and behavioral disengagement, such as giving up to deal with stressful situation, were often the result. See below for some representative quotes:

‘By far my most coping mechanism is eating, and you can tell by weight that is increasing, I’m now in my least fit shape.’ (R3, P2, M)

‘If you know that you can’t do it then there’s no point in stressing it out in being unable to do it.’ (R3, P3, F)

‘I watch movies. Movies is one way to escape from the stress and hospital life.’ (R4, P2, M)

4. Discussion

The objective of the present study was to shed more light on the issue of workplace time pressure by conducting a focus group study with internal medicine residents. Unlike many exiting quantitative studies,^{8,21–23} we managed to run an in-depth qualitative focus group study from all four years of the residency training, which was expected to result in a more complete picture of the time pressure they are facing at different stages in their training. Besides exploring what are the sources of time pressure in workplace, we tried to find out what the negative effects of perceived time pressure for the residents' psychological well-being and patient safety and what kind of coping strategies they apply. Structured interviews were conducted with seventeen residents.

Thematic coding analysis of the transcribed responses of the participants revealed that there were four main themes that emerged as main sources of time pressure for internal medicine residents. These were (1) patient-related factors, (2) practice-related factors, (3) training-related factors and (4) resident-related factors. All of these four main themes generated each two subthemes. Based on the frequencies of utterances (mentions), the data suggest that the increased number of patients constituted the main source of perceived time pressure; most of the responses (26.79%) referred to this as a source of time pressure. The second most pertinent source of perceived time pressure was long working hours (14.29%). Judging by the number of mentions, particularly junior residents perceived this as a significant source of time pressure. Since senior residents mentioned it substantially less frequent, it appears that senior residents become more used to the long working hours as they progress with their training. The third most mentioned source of perceived time pressure was dealing with difficult consultants. Close to 13% of the responses referred to this as a source of time pressure. Most mentions came from the junior residents (i.e., 11.31%).

Our data also demonstrate that there are sizable differences between junior and senior residents with respect to perceived time pressure. The level of experience and roles and responsibilities were the largest sources of perceived time pressure that were most dominant for senior residents and less so for junior residents. This suggests that as the residents progress their training, their responsibilities as a doctor increase which results in feeling more (time) pressured.

As a next step we focused our attention to the negative consequences of perceived time pressure. Interestingly, time pressure affected more residents' performance rather than their health. The three most negative effects were suboptimal patient care (26.72% of mentions), medical errors (24.14% of mentions) and cognitive impairments (18.1% of mentions). Judging by the number of mentions, suboptimal patient care and medical errors were mentioned twice as much by junior residents, whereas cognitive impairments were mentioned almost three times as much by senior residents.

Finally, our data also provide insights in how residents cope with the negative consequences of perceived time pressure. It is encouraging to see that the residents mentioned using more adapting active coping strategies (87.14%) rather than avoidant maladaptive coping strategies (12.86%). There were no noteworthy differences between junior and senior residents with regard to the use of active coping strategies. Most of the active coping strategies entailed prioritizing tasks and relying on a social/family support network.

What are the implications of these findings? To our best knowledge, this research is one of the first qualitative studies that investigated the perceived time pressure at a broader spectrum of the residency program, ranging from first to fourth year of residency. The study elaborated on the sources of time pressure, its negative effects and how internal medicine resident is coping with it?

Covering four years of the residency program provided significant insights in potential differences between junior and senior residents. From our study it appears that junior residents struggle more with workload-load related factors (number of patients, working hours and how to deal with consultants), which results in suboptimal patient care and more medical errors. These issues seem to be largely resolved when becoming a senior resident, but they make way for new challenges. Senior residents seem to struggle more dealing with their newly acquired roles and responsibilities often feeling disorganized and not able to carefully collect, analyze and diagnose their patients correctly.

In conclusion, this largely qualitative study unearthed a number of influences in the residents' workplace that negatively affected their work satisfaction, health, and performance. While having pleasure in one's work and living a life without too much stress are characteristics worth pursuing, one outcome is particularly worrisome: the fact that residents

believe that the conditions of the workplace affect their performance, leading to increased medical error. It is this threat to patient safety that deserves further scrutiny.

Ethical approval

Ethical approval has been granted from the institutional review board of the National Guard Health Affairs, Riyadh, Saudi Arabia approved the study (RC10/122).

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Declaration of competing interests

The authors have no competing interests to declare.

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