Actual compared with rostered overtime hours of interns at Charlotte Maxeke Johannesburg Academic Hospital, South Africa

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Background. Extended working hours (working >16 hours continuously) of intern doctors (interns) are commonplace globally and persist in clinical practice. The reasons for this situation are numerous, but the main ones are the shortage of interns and the desire for continuity of care. However, these extended working hours are accompanied by their own set of repercussions.
Objectives. To explore this particular aspect of South African (SA) public healthcare by comparing actual v. rostered overtime hours of interns at Charlotte Maxeke Johannesburg Academic Hospital (CMJAH). Data on intern working hours in this setting were collected and analysed, followed by a critical evaluation of the functionality and legality of these working hours.
Results. The principal findings of this study confirm that the number of actual overtime hours worked is greater than the number of rostered overtime hours for interns at CMJAH. The findings are in keeping with those of previous studies, both nationally and internationally, in that interns at CMJAH were shown to have worked in excess of the maximum total overtime per month permitted by the Health Professions Council of South Africa. In addition, intern working conditions were analysed and deemed not to meet objectively reasonable workplace standards in several different domains.
Conclusion. This study contributes to research into the regulation of intern working hours in SA. Further studies at other institutions and in other contexts are necessary to substantiate the need for adjustment of intern working hours nationally.

Keywords. Extended working hours, HPCSA, intern doctors, overnight calls, overtime.

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Extended working hours (working >16 hours continuously) of intern doctors (interns) are commonplace globally and persist in clinical practice today.[1] There are many reasons for this situation, including medical intern shortages and desire for continuity of care.[1] However, extended working hours have repercussions. Among the adverse effects of extended working hours for interns are impaired performance and burnout, translating into substandard patient care.[2]

The literature suggests that extended working hours are intrinsic to most junior doctors' training programmes worldwide, despite the dangers inherent in this practice, including sleep deprivation and impaired clinical judgement, which adversely affect patient care.[1] There are country-specific working hour guidelines for interns, and South Africa (SA) is no different. The Health Professions Council of South Africa (HPCSA), a statutory body regulating SA healthcare professionals under the Health Professions Act 56 of 1974,[3] sets guidelines to satisfy the intern training programme while maintaining safe working hours. Interns are junior doctors who have completed medical school and are fulfilling a 2-year mandatory training programme at a Department of Health-accredited facility. The HPCSA *Handbook on Internship Training*, 2022 edition[4] (which prevailed at the time of the study), stated that interns may work no more than a maximum of 26 consecutive hours. Working more hours could impair an intern's ability to provide quality patient care.

The HPCSA handbook states that intern duty hours are set at 40 hours per week during normal working hours and a maximum of 20 hours per week of commuted overtime. Commuted overtime is defined by the National Policy on Commuted Overtime for Medical Officers as hours of

work additional to the total number of normal hours of work required by the employer.[5] Interns should work no more than a maximum of 80 hours of commuted overtime in a 4-week cycle. However, a 2016 investigation of interns at King Edward VIII Hospital, Durban, yielded 63 cases of working more than 80 hours of commuted overtime in a 4-week cycle, with some interns working more than 100 hours of commuted overtime in a 4-week cycle.[6]

Changes to working hour regimens are possible, and have been implemented in other countries. Before 2003, working hours of interns in the USA exceeded 80 - 110 hours per week. On-call extended working hours were a continuous 36 hours, every 2 - 3 days.[2] In 2003, the Accreditation Council for Graduate Medical Education implemented national working hour restrictions to ameliorate the deleterious effects of extended working hours on interns.[2] These restrictions included a maximum of 80 hours per week of on-duty work and 24 hours of continuous duty.[2]

Similar working hour restrictions were implemented in the European Union (EU). In 1998, the European Working Time Directive was implemented in each EU member state.[7] In the UK, it was termed Working Time Regulations (WTR). The WTR mandates that interns may work no more than 48 hours per week, averaged over a period of 26 weeks, in addition to stipulated minimum rest periods.[8] Specifically, workers are permitted three different types of breaks: work breaks of 20 consecutive minutes for every 6 hours worked, daily breaks of 11 consecutive hours between working days, and weekly breaks of either 24 consecutive hours per week or 48 consecutive hours per fortnight.[7]

SA has a legal framework that restricts working hours and overtime for employees below managerial level. Chapter 2 of the Basic Conditions of Employment Act 75 of 1997 (BCEA)[9] mandates that employers can require no more than 45 ordinary working hours and an additional 10 (or 15, if agreed) overtime hours per week. Employers must regulate working times for employee health and safety, and allow adequate intra- and inter-working hour rest periods. Specifically, employers must allow a daily rest period of at least 12 consecutive hours between concluding work and commencing a new period of work. Employers must allow a weekly rest period of at least 36 consecutive hours. Similarly, intra-working hour rest periods are mandated as a 1-hour meal break for every 5 consecutive hours worked.

However, the legal limitations on working hours do not protect employees earning more than an earnings threshold set by the Minister of Employment and Labour. In February 2023, that threshold was ZAR241 110.59 per year (ZAR20 092.55 per month).[10] Interns' gross salaries exceeded that threshold. Consequently, the protections of chapter 2 of the BCEA did not apply to them. Internship is compulsory to qualify as a medical practitioner. With their working hours legally unlimited, no alternative path to qualify to practise, and no overtime restrictions, interns are vulnerable to exploitation.

The remedy is unclear, but not unguided. While it is argued that intern extended working hours contradict the BCEA,[11] others take this further, arguing that the HPCSA guidelines are also contravened.[12] These discrepancies necessitate intervention to limit SA intern working hours.

The aim of this research was to compare the number of actual overtime hours worked with the number of rostered overtime hours of interns at Charlotte Maxeke Johannesburg Academic Hospital (CMJAH), Johannesburg, to determine whether overtime hours are in accordance with the HPCSA guidelines and their contract of employment. The research objectives were:

- To compare working hours from the contract of employment with overtime hour rosters for each rotation worked by interns at CMJAH over a 30-day period (1 - 30 January 2023)
- To ascertain actual overtime hours worked in the intern environment at CMJAH.

Methods

The research design was a mixed-methods, cross-sectional study. CMJAH was the study site, selected because of its large intern cohort (N=107) and accessibility to the research team. All CMJAH interns employed during January 2023 constituted the study population. The Human Research Ethics Committee (Medical) of the University of the Witwatersrand provided ethical approval (ref. no. M220826), and permission to conduct the study was obtained from the CMJAH CEO. The research project was also submitted to the National Health Research Database.

Data pertaining to actual and rostered intern overtime hours at CMJAH were collected with Google Forms (Google LLC, USA) via an anonymous electronic questionnaire developed by the researchers, containing 23 questions without subsections or division. No demographic data were requested. Questions aimed to extract data on actual hours worked, whether extra overtime was voluntary or compulsory, inter- and intra-working hour rest periods, meal breaks, availability and condition of overnight rest facilities, whether the respondents' annual salary exceeded threshold, whether they had ever been in a motor accident after overnight calls, and familiarity with the CMJAH intern contract of employment and relevant legislation.

A pilot study was performed to assess efficacy of the questionnaire. Three interns at CMJAH were randomly selected for the pilot study, and the questionnaire was emailed to them in March 2023. Only one intern responded, which limited the pilot study's usefulness. The questionnaire was adjusted for comprehensibility.

The CMJAH Human Resources Department (HR) provided the researchers with intern email addresses and specimen employment contracts. Call and overtime rosters for January 2023 were obtained for each rotation. HR directed communication to first- and second-year intern representatives, who provided the principal researcher (KR) with a list of email addresses for all first- and second-year interns. The list remained confidential, and was password protected.

The questionnaire was emailed to the study population, excluding the intern from the pilot study. Three emails failed to deliver, so 103 interns received the questionnaire. All responses were rendered anonymous by Google Forms, and only one response was possible per participant. The questionnaire introduction detailed the risks and benefits of participation, confirmation of confidentiality and anonymity, ethical approvals and the right to withdraw. Completion and submission of the questionnaire constituted informed consent.

As expected with email questionnaires, a low response rate of 23.3% (n=24) was recorded. Responses were automatically collected in a Google Sheet downloadable to Microsoft Excel. Microsoft Excel (version 2304, 2023; Microsoft Corp., USA) and Stata (version 17, 2021; StataCorp, USA) were used to analyse collected data. Data pertaining to intern overtime hours were extracted from the Excel spreadsheet and compared with corresponding rotation rosters. Specifically, a 'master' roster was

created for each rotation (as an Excel spreadsheet) by inputting each rotation's rostered overtime hours for one randomly selected intern, to distinguish between ordinary working hours and interns' rostered overtime. Upon completion, each rotation was represented by an Excel spreadsheet containing working hours allocated by each department. For example, if a rotation required 6 overnight calls of extended working hours, the 'master' roster would include 5 working days (Monday - Friday) per week, a minimum 8 hours worked per day (or 40 hours per week in accordance with the interns' contract of employment), and 6 overnight calls of extended working hours for the month of January 2023. Rostered extended working hours for each intern in each rotation were the same and evenly distributed across weekends. This provided the average number of rostered working hours required of each intern in that rotation for the month of January 2023.

Each intern's questionnaire responses were inserted into the 'master' roster for the rotation they worked in January 2023, to determine the actual total overtime hours worked by that respondent. The time that the interns began and finished work, frequency and duration of meal breaks, number of overnight calls, extensions into the next workday, and frequency and duration of breaks (if any) were recorded for each respondent. Manual tabulation was done of the total hours worked by each respondent and compared with the 'master' roster. The outcome was consistent rostered working hours for each rotation, but variable unrostered working hours for each respondent.

Open-ended question responses (chiefly pertaining to description of overnight rest facilities, and presence/absence of rest and meal breaks) were classified into discrete categories and catalogued.

Data collected from this study were subject to information, recall and selection bias, the latter mainly because more first-year interns than second-year interns responded. This produced data more representative of first-year, rather than all, CMJAH interns.

Results

Stata was used to organise data into groups and frequencies for ease of use in manual statistical analysis. Of 106 emails sent, after excluding the single intern from the pilot study, 103 were delivered, and 24 responses were received, a 23.3% response rate (Table 1). Of the responses, 62.5% (n=15) were from first-year interns and 37.5% (n=9) from second-year interns. All 24 (100%) of the respondents exceeded rostered working hours, with 83.3% stating that these working hours were compulsory (Fig. 1).

Table 1. Number of responses received per rotation

Rotation	Respondents, *n* (%)
Anaesthesiology	4 (16.7)
Family medicine	2 (8.3)
Internal medicine	4 (16.7)
Obstetrics and gynaecology	3 (12.5)
Orthopaedics	2 (8.3)
Paediatrics	5 (20.8)
Psychiatry	1 (4.2)
Surgery	3 (12.5)
Total	24

Average total overtime worked for the month of January 2023 was 117.19 hours, 37.19 hours more than the maximum 80 hours permitted per month as per the HPCSA handbook. Only 16.7% of the interns (n=4) had read legislation pertaining to their employment contract.

Maximum rostered overtime was exceeded by 2 of 8 rotations (25.0%): obstetrics and gynaecology at 89.5 hours and orthopaedics at 89 hours. Six rotations (75.0%) complied with HPCSA guidelines, rostering less than or equal to the maximum permitted overtime. However, this differed greatly from the unrostered overtime worked. Surgery exceeded the maximum permitted overtime per month, with total overtime (i.e. the sum of rostered and unrostered overtime) more than double, averaging 160.7 hours of total overtime per month (average of 90.7 hours of unrostered overtime per month). Obstetrics and gynaecology averaged 135.5 hours of total overtime per month (average of 46 hours of unrostered overtime per month), which exceeded the maximum permitted total overtime per month by 69.4%.

Orthopaedics averaged 128.5 hours of total overtime per month (average of 39.5 hours of unrostered overtime per month), exceeding the maximum permitted total overtime per month by 60.6%. Internal medicine averaged 119.5 hours of total overtime per month (average of 57.5 hours of unrostered overtime per month), exceeding the maximum permitted total overtime per month by 49.4%.

Paediatrics averaged 116.4 hours of total overtime per month (average of 36.4 hours of unrostered overtime), exceeding the maximum permitted total overtime per month by 45.5%. Family medicine averaged 97.5 hours of total overtime per month, which exceeded the maximum permitted total overtime per month by 21.9%. Anaesthesiology averaged 90.5 hours of total overtime per month, which exceeded the maximum permitted total overtime per month by 13.1%.

Psychiatry, although represented by only one response, did not exceed the maximum permitted total overtime per month. Only 5 hours of unrostered overtime were reported, giving 50 hours of total overtime worked by this respondent. This was the only rotation compliant with the HPCSA handbook. Interns in 7 of the 8 rotations (87.5%) at CMJAH worked overtime in excess of the maximum permitted total overtime of 80 hours per month (Fig. 2).

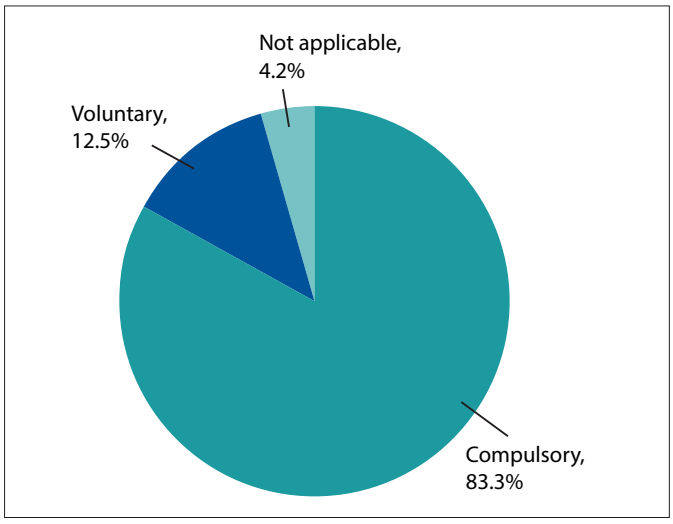

Fig. 1. Pie chart showing percentage of interns required to work longer than rostered overtime hours.

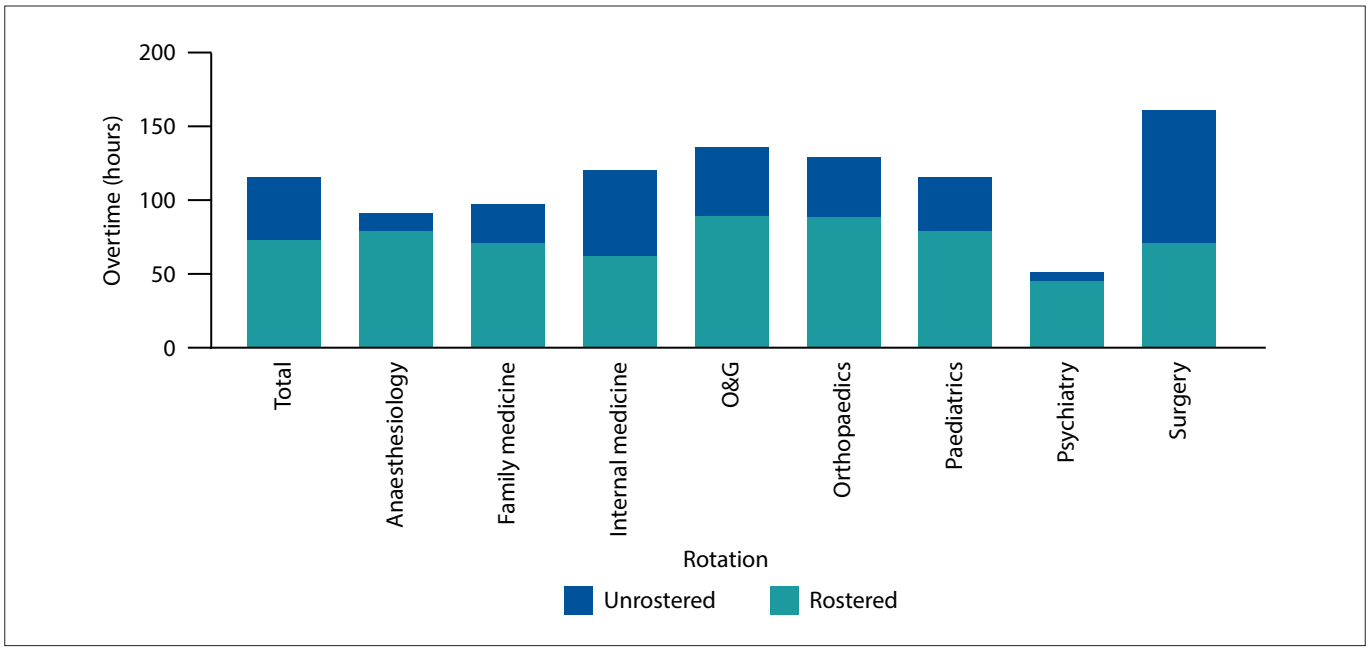

Fig. 2. Bar graph showing rostered and unrostered overtime hours per rotation. (O&G = obstetrics and gynaecology.)

The question regarding frequency of meal breaks was answered by 29.2% of participants (*n*=7): 42.9% of these participants (*n*=3) received a meal break once daily, 14.3% (*n*=1) twice daily, 14.3% (*n*=1) thrice daily, and 28.6% (*n*=2) received no meal breaks (Fig. 3). One participant went as far as to say 'I starved' during working hours. Regarding duration of meal breaks, 14.3% of participants (*n*=1) received no meal break time, 14.3% (*n*=1) received 10 minutes, 14.3% (*n*=1) received 15 - 30 minutes, 28.6% (*n*=2) received 30 minutes, and 14.3% (*n*=1) received 30 - 60 minutes.

A secondary objective was to solicit information about the environment in which interns worked. Qualitative questions in the questionnaire were categorised according to specific answers given by each participant, following rudimentary narrative analysis. For example, in response to a question such as 'Please describe those rest facilities', an answer given as 'Bed, clean linen and toilet available' was categorised leniently regarding acceptability for overnight rest facilities. All 24 participants responded to this question (Table 2), with 14 responses (58.3%) classified as 'acceptable', 4 (16.7%) classified as 'acceptable, but not comfortable', and 1 (4.2%) classified as 'acceptable and comfortable'. Five participants (20.8%) described the rest facilities as 'unacceptable', with one participant stating that the facilities were 'dirty with cockroaches'. Other responses included 'Shared room with other MOs and registrars. No privacy.'

Nonsensical responses to the questionnaire were discarded to avoid confoundment. For example, numerical responses to open-ended questions or statements demonstrating question misinterpretation were excluded from data analysis. Additionally, a question regarding motor vehicle accidents after a period of extended working hours was excluded owing to its ambiguity.

Discussion

The principal findings of this study confirm that the number of actual overtime hours worked was greater than the number of rostered overtime hours for interns at CMJAH.

The study correlates with previous studies,[1,2,6] both national and international, as 23/24 respondents (95.8%) worked more than the maximum total overtime per month permitted by the HPCSA handbook. Quantification of these working hours demonstrates that interns at CMJAH work average overtime hours of 57.1% more than their average rostered overtime (averaged across all departments), frequently working more than 150% of rostered working hours (11/24 responses in this study). Furthermore, this study corroborates the 2016 investigation of intern working hours at King Edward VIII Hospital, Durban, demonstrating that interns at CMJAH frequently work more than their rostered overtime hours (i.e. 23 cases of working more than 80 hours overtime in the present study v. 63 cases (of 205 responses) at King Edward VIII Hospital).[6] The Durban study provides only a single corroboration regarding intern working hours nationally owing to scarcity of literature in this regard; however, it may imply similar trends in institutions countrywide.

A particularly important aspect of the present study was confirmation that the median intern salary at CMJAH exceeded the earnings threshold set by the Minister of Employment and Labour at ZAR241 110.59 per year.[10] Intern working hours were neither limited by the BCEA nor compliant with the restrictions imposed by the HPCSA handbook, leaving interns vulnerable to overtime exploitation.

Additionally, there are no provisions in the CMJAH interns' contract of employment that prohibit working hours in excess of the maximum permitted total overtime per month in accordance with the HPCSA handbook, and no assurances of regular meal and rest periods.

There are several strengths and weaknesses of this study. A strength of the study was the study population – interns at a tertiary hospital in a metropolitan area. This study population actualised quantitative analysis of demands placed on interns in a busy tertiary centre, i.e. a significant number of unrostered overtime hours. Additionally, respondents answered open-ended questions that elucidated the quality of intern working conditions.

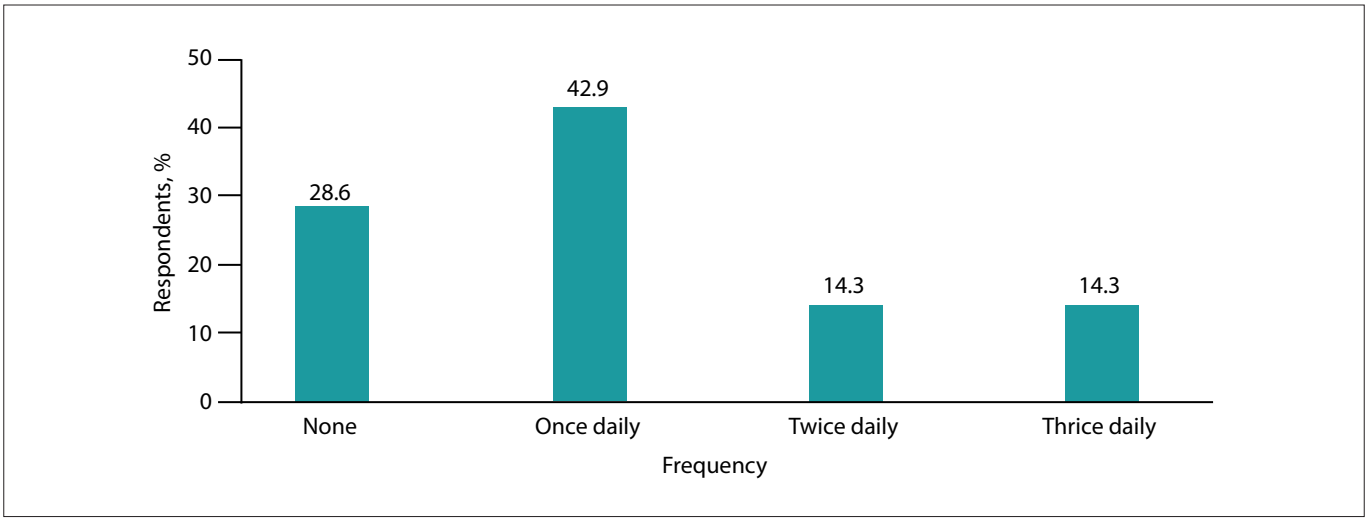

Fig. 3. Bar graph showing frequency of meal breaks.

Table 2. Classification of overnight rest facilities

Classification	%
Unacceptable	20.8
Acceptable	58.3
Acceptable, but not comfortable	16.7
Acceptable and comfortable	4.2
Total	100

Despite rigorous design, the study has several limitations that predominantly pertain to the time frame of data collection and the lack of data generalisability to other hospitals in SA. Additionally, the data may be more representative of the first-year intern working experience at CMJAH rather than the intern working experience as a whole.

This study highlights the significant working demands placed on interns at CMJAH, particularly the number of uncompensated unrostered overtime hours and consequent ethical implications. Of greatest concern was one comment that stated, 'Working 24 hours without rest is a health hazard, not only to me as a person but also to the last few patients I'll be seeing [during] the last few hours of the call.' Notably, interns indicated awareness of the significant number of uncompensated working hours, with one intern remarking, 'Overtime pay does not cover the actual overtime at all.'

Conclusion

The research aim was achieved, and this study now contributes to further research into the regulation of intern working hours in SA. Although several questions remain unanswered, most notably the optimal balance between working hours and adequate professional training, it is certain that this study forms part of a larger body of evidence assisting towards the improvement and prevention of extended unsafe and unpaid intern working hours in the future.

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Author contributions. All the student authors contributed equally to this research. NE conceptualised the study, supervised the student authors throughout the research process, and contributed to the analysis and write-up of the final manuscript.

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Data availability statement. The datasets generated and analysed during the current study are available from the corresponding author (KR) upon reasonable request.

Conflicts of interest. None.

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