

Absenteeism: A retrospective cross-sectional study among employees of the municipality of Keratsini for the year 2022

Sarros G¹, Menti A², Katrachouras I¹, Stergiakouli V³, Makrynos G¹, Rapisarda V⁴, Dounias G¹

¹ Occupational and Environmental Health, Department of Public Health Policy, University of West Attica, Athens, Greece

² Hypertension Center STRIDE-7, National and Kapodistrian University of Athens, School of Medicine, Third Department of Medicine, Sotiria Hospital, Attica, Greece

³ 401 General Military Hospital of Athens, Athens, Attica, Greece

⁴ Università degli Studi di Catania, Scuola di Medicina, Catania, Italy

ABSTRACT

Corresponding author:

Sarros Georgios,
Specializing physician in Occupational
and Environmental Medicine,
Department of Public Health Policy,
University of West Attica, Athens,
Greece.

E-mail: geosar1992@hotmail.com

Tel.: +306946632131

ORCID ID: <https://orcid.org/0009-0007-8330-7284>

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Introduction: Absenteeism is a multifactorial phenomenon. The aim of the study was to conduct an analysis with specific indicators (Absenteeism rate, Frequency of sickness absence, Cumulative incidence, Duration of absence, Length of sickness absence, Bradford Score) among municipal employees and the comparison through certain variables (gender, position, age, seniority).

Methods: In this retrospective cross-sectional study, the sample was the employees of the Municipality of Keratsini for year 2022. Data were collected through the individual employees' sick leave file, processed with Microsoft Excel and statistically analyzed with Stata (chi-square tests). A comparison of the results between two previous studies with the same sample followed.

Results: Females (n=179/45.8%) received statistically sick leave more frequently (females with at least one sick leave: n=148/82.7%, males with at least one sick leave: n=128/60.4%) (p<0.005) and employees with 20-29 years of service (n=117/29.9%) received significantly more likely to take sick leave (employees with 20-29 years of service with at least one sick leave: n=89/76.1%) (p=0.04). Regarding the 3 studies' comparison, there was an increase in the number of absentees (2001: n=155/55%, 2007: n=134/40%, 2022: n=276/70.5% (p<0.001) and in the granting of sick leave with a medical certificate (2001: n=219/45.7% 2007: n=133/39%, 2022: n=252/30%) (p<0.001) and a health board (2001: n=110/23% 2007: n=102/29.9%, 2022: n=304/36.3%) (p<0.001).

Conclusion: Absenteeism indicators can reveal groups or individuals with an increased propensity to receive sick leave. Some of the study's results aligned to international literature (category of female employees, category of cleaning employees). Longitudinal comparison revealed an increase in absenteeism that could be justified by a number of factors (increased age, COVID-19 pandemic, periods of economic or health crisis). A number of countermeasures are suggested (close monitoring, return-to-work interviews, vaccination, ensuring personal hygiene in the workplace, upgrade of the role of occupational physicians).

Keywords: municipal employees, absenteeism, sickness absence, sick leave.

Introduction

Absenteeism is an employee's non-presence in the workplace, an action affected by multiple factors, including sick leave.¹⁻³ There is a separation of the general population based on the risk of

absenteeism (general population – working population with insurance – population with sick leave, absenteeism pyramid).⁴

Absenteeism has implications for the employee directly, leading to pay deductions, disruption to career development, psychological deterioration, and social isolation. But it also affects the working organization, by disorganizing it, increasing the cost of substitution and overtime pay and causing productivity loss.³⁻⁸

There is also a positive outcome, as sick employees recover completely through rest due to sick leave and rehabilitation. This protects the other employees in the event of infectious diseases.⁷ This phenomenon, in a certain population sample,³⁻⁴ is thoroughly studied using specific indicators and tools for estimating, apart from variables, such as occurrences, timeline, gender, occupation, age, and education.⁵ The indicators aim to examine the phenomenon from the financial, medical, social, or psychological viewpoint.^{4,6} There are as many as 40 indicators used; however, only 10 of those indicators are used frequently,⁷ and 5 indicators are used in major studies. In this study, the Bradford Score, absenteeism rate, frequency of sickness absence, cumulative incidence, duration of absence, and length of sickness absence are selected.⁶

According to past studies and published literature, health employees and unskilled employees are at high absenteeism risk, while managers, PC technicians and office employees are at low risk.^{9,10} Regarding diseases, in the United Kingdom (UK), the most frequent reasons for health conditions were musculoskeletal and psychiatric disorders.¹¹ Moreover, in India, among female employees, between two groups, the group that was exposed to a higher physical load developed more musculoskeletal disorders and had lower weight, BMI and hemoglobin concentration.¹² Concerning other factors, absenteeism was more frequent with increasing age, involving the female gender (however, with lower mortality), and with lower Education level.^{13,14} Also, absenteeism increased in Iceland during the economic crisis of 2008 after an organizational downsizing in the remaining personnel; however, this happened even in departments that were not affected by downsizing.¹⁵

The aim of this study is to determine whether published studies and data on absenteeism apply to the current study population, and to analyze the similarities and differences between our findings and those of previous studies conducted among similar population groups.

Methods

We conducted a retrospective cross-sectional study. The study sample includes all municipal employees in Keratsini in 2022. The year was chosen because the study took place in 2023 and because of the COVID-19 pandemic, the most recent year with complete data was preferable, in order to have the lowest possible impact from COVID-19 related absences.

The data were collected from the Personnel Records and Procedures Department of the Municipality of Keratsini. Microsoft Word and Excel were used to process files containing lists of employees by tenure and position. The Municipality's STAFF program was used as it includes administrative details of the sick leaves as well as the employee's personal file, where the additional medical details regarding each sick leave were contained. The data are stored and processed in the Municipality's HR department and were accessed with the verbal permission of the head of the department and the Municipality, without exposing employees' personal information. Therefore, no approval from an ethics committee was necessary.

Sick leaves were categorized according to cause, way of granting (three ways, one day justified by the employee himself with a solemn declaration, sick leave granted by a doctor and approved by a health committee) and whether they are related to a weekend or a holiday (bridge effect).

The parameters considered were gender, age, job position, and years of work after obtaining permission from the Municipal Authority and the Infirmary of the Municipality as sensitive personal data, not shared with third parties or the administration. Data entry and analysis were done with Microsoft Word and Microsoft Excel. The statistical analysis was performed using Stata

2013. The method used was chi-square tests. The absenteeism metrics were calculated using the mean value as a measure of central tendency; however, the median was also calculated.

The employees are divided into three categories based on job position and occupational exposure (A: office/administrative employees, B: artisans/craftsmen, C: others). For a more detailed study of the employees, and an easier comparison with the previous works, the category of artisans/craftsmen was further divided into 4 subgroups: (B1 Cleaning, B2 Gardens, B3 Technicians, B4 Drivers)

Many parameters, including the calculation of the specific absenteeism indicators [Absenteeism rate (days of absence/working day $\times$ 100%), Frequency of sickness absence (number of sick leaves/employee $\times$ 100%), Cumulative incidence (employees that received sick leave/total number of employees $\times$ 100%), Duration of absence (days of absence/sick leave), Length of sickness absence (days of absence/employee that received sick leave), Bradford Score [days of absence $\times$ (incidents of absence)²] and the categorization of Bradford Factor (0-300, 300-500, >500 points) despite possible changes that may have occurred in the operation of the Municipality, have been

Results

Regarding gender, the employees in the study consisted of males (54.2%) and females (45.8%). The age range was between 26 and 68 years (median 53 - mean 51.77), the prevailing age was 54 years [standard deviation (SD) of 7.44 and a standard error (SE) of 0.38]. The prominent age group among the employees was between 46 and 55 years.

The employment range was 0 - 41 years, (median 18 - mean 16.91), a mode of 4 years, SD 11.3 and SE 0.57, while 0-9 years of service range employees represented the largest group in the study.

A total of 391 employees were considered for the study, with 838 incidents of absence and 3901 days of sick leave (per incident) in the study population. There was a statistically significant association

received, categorized and calculated with as much relevance as to the previous studies for the best possible comparison that follows.

Absences were recorded as working days instead of working hours because it was impossible from existing records to know whether the sick leave started before, during or after work. For the year 2022, 251 days were considered as working time. The days lost were calculated as the total sick days of absence of a person, a categorized group of the whole study population during the time of the study chosen, a month, a quarter, or the whole year.

Regarding the reason for sick leave and the month it began, the very high overlap in absences among many people made it extremely difficult to calculate statistical differences between the individual categories. Regarding months, a statistical difference was calculated by quarter using a chi-square test for ratio comparison. Regarding quarters, the first and fourth quarters are the months with the most unfavorable weather and the highest transmission of seasonal infections (influenza and gastrointestinal viruses). The third quarter of the year has mostly good, mild weather and is the leave period, so a reduction in sick leave is logical, since many employees are already absent.

between taking sick leave and gender. Therefore, female employees ($n=179/45.8\%$) were more likely to take sick leave than their male colleagues (females with at least one sick leave: $n=148/82.7\%$, males with at least one sick leave: $n=128/60.4\%$) ($p<0.005$).

Regarding job position, the largest percentage of employees who received at least one sick leave was administrative employees (A), followed by employees in other positions. Cleaning employees (B1) were the most numerous who were absent at least once. There was no statistically significant difference in absence ($p=0.65$).

By age, the largest percentage of employees who received at least one sick leave was in the 56-to-65-year age group, followed by the 46-to-55-year age

group. However, there wasn't a statistically significant difference in absence ($p=0.24$).

Regarding working seniority, the largest percentage of employees who received at least one sick leave was among those with 20 to 29 years of service ($n=117/29.9\%$), followed by those with 10 to 19 years and 30 to 39 years. There was a statistical significance, meaning that employees with the aforementioned years of employment received sick leave more often compared to the other categories of employees (employees with 20-29 years of service with at least one sick leave: $n=89/76.1\%$) ($p=0.04$).

The three ways to obtain sick leave are a solemn declaration by the employee, a medical certificate, and approval from a health committee (for leave over 8 days). As leave granting was concerned, there was a statistically significant difference, i.e. a sick leave was more likely to be granted by the relevant health board than by a certificate ($p=0.026$).

Sick leaves were checked for the bridge effect (leaves up to 3 days related to a weekend or holiday), where a very large proportion was found to be correlated.

There was a separation of sick leave according to the medical reason for which it was granted. The most frequent were Unexcused (36.9%), Respiratory (20.2%), Musculoskeletal (14.9%), and Gastrointestinal (9.8%). The leaves, justified by the employee himself with a solemn statement, were registered as unexcused.

Finally, there was also a distinction regarding the starting month of sick leave and the number of days of leave granted in each month. The most sick leaves were observed to be granted in January, followed by November, February and December of 2022, while the least sick leaves were granted in August and September of 2022. However, in terms of days "lost" per month, the same pattern was not observed. The first month with lost working days was November, followed by June, February, and October of 2022, while the months with the fewest "lost" days were April and August of 2022.

Following the monthly division of sick leave, a quarterly division of absence incidents was also made. The first quarter of the year had the highest percentage of sick leave granted, followed by the fourth quarter, while the third quarter had the lowest percentage. Statistically, using a chi-square test for ratio comparison, a significant difference emerged in sick leave granting ($df = 3$, $p<0.001$), confirming that there is a difference in the granting of sick leave between the first and fourth trimesters and the third trimester.

Of the 391 employees, 276 (70.5%) received at least one sick leave, while 115 (29.5%) did not. Total sick leave days ranged from 0 to 221 (median 2 days - mean 9.97 days - mode 0 days), SD 20.29, and SE 1.02. For employees with at least one absence, total sick leave days ranged from 1 to 221 (median 6 days - mean 14.13 days - mode 2 days), a SD of 22.90, and a SE of 1.38, with a total of 3901 days lost. For employees with at least one absence, absenteeism incidents per employee ranged from 1 to 18 (median 2 incidents; mean 3.03 incidents; mode 1 incident), with an SD of 2.38 and an SE of 0.14, for a total of 838 absence incidents.

Bradford Score for employees with at least one absence ranged from 1 to 17901 (median 34 - mean 476.61 - mode 1), SD of 1729.27, and SE of 104.09.

A calculation of the 6 absenteeism indicators mentioned in the general part as more representative and reliable was performed, both for all employees and for the categories analyzed in the specific part (gender, position, age, seniority).

It is concluded that female employees tend to be absent more frequently and in absenteeism incidents, men are absent for more consecutive days. This is confirmed by the total number of days lost. However, with regard to the Bradford factor, female employees seem to have higher values, especially on the larger scales, which was expected due to the higher number of absence incidents (despite receiving shorter absence leave) (see Table 1).

Table 1: Indicators of absence in total and by gender

Indicators	Total	Male	Female
Absenteeism rate (days of absence/working day x 100%)	3.97%	3.78%	4.21%
Frequency of sickness absence (number of sick leaves/employee x 100%)	214.32%	170.28%	266.48%
Cumulative incidence (employees who received sick leave/total number of employees x 100%)	70.59%	60.38%	82.68%
Duration of absence (days of absence/sick leave)	4.66	5.57	3.97
Length of sickness absence (days of absence/employee who received sick leave)	14.13	15.69	12.78
0<Bradford<300 (points)	78.98%	82.03%	76.35%
0<Bradford<300 (overall) (points)	55.75%	49.53%	63.19%
300<Bradford<500 (points)	4.71%	2.34%	6.75%
300<Bradford<500 (overall) (points)	3.32%	1.42%	5.59%
Bradford>500 (points)	16.3%	15.62%	16.89%
Bradford>500 (overall) (points)	11.51%	9.43%	13.97%
Total days lost (n)	3901	2009	1892
Total incidents (n)	838	361	477
Total population number (n)	391	212	179
Absent (n)	276	128	148
Present (n)	115	84	31

It appears that administrative office employees (category A) have an increased frequency and cumulative effect of absenteeism (as a percentage, more employees have taken sick leave and take leave more frequently), it is the cleaning employees (category B1) who have the longest average length of absence per case and duration

of absence, meaning that although leaves are taken less frequently, when they are taken, each absence lasts for more days. Overall, the category of cleaners also has the most lost days (however, as a category, it is the most numerous by quite a margin), while regarding the Bradford factor, administrative/office employees have the highest percentage on the largest scale (see Table 2).

Table 2: Absenteeism Indicators by Job Position

Indicators	A	B1	B2	B3	B4	C
Absenteeism rate (days of absence/working day x 100%)	4.13%	5.23%	3.35%	2.45%	1.87%	3.47%
Frequency of sickness absence (number of sick leaves/employee x 100%)	355.17%	182.76%	196.3%	154.9%	100%	218.6%
Cumulative incidence (employees who received sick leave/total number of employees x 100%)	88.51%	64.14%	70.37%	64.7%	47.37%	83.72%
Duration of absence (days of absence/sick leave)	2.92	7.19	4.28	3.97	4.68	3.99
Length of sickness absence (days of absence/employee who received sick leave)	11.71	20.48	11.95	9.52	9.89	10.42
0<Bradford<300 (points)	68.83%	77.42%	84.21%	93.94%	88.89%	83.33%
0<Bradford<300 (overall) (points)	60.92%	49.66%	59.26%	60.78%	42.11%	69.77%
300<Bradford<500 (points)	7.79%	3.23%	5.26%	3.03%	5.56%	5.56%
300<Bradford<500 (overall) (points)	6.9%	2.07%	3.7%	1.96%	2.63%	4.65%
Bradford>500 (points)	23.377%	19.35%	10.53%	3.03%	5.56%	11.11%
Bradford>500 (overall) (points)	20.69%	12.41%	7.41%	1.96%	2.63%	9.3%
Total days lost (n)	902	1905	227	314	178	375
Total incidents (n)	309	265	53	79	38	94
Total population number (n)	87	145	27	51	38	43
Absent (n)	77	93	19	33	18	36
Present (n)	10	52	8	18	20	7

It is observed that the age groups between 46 and 55 and 56 and 65-year-olds are absent more often, but the age groups between 36 and 45 and 46 and 55-year-olds seem to be having a longer period of absence. The age group 46 to 55-year-old presents more lost days, while it is also the most populous. The 3 middle-age categories (36 to 45 years old, 46 to 55 years old, 56 to 65 years old) have a high percentage of absentees, with the largest category (46 to 55 years old) showing the highest Bradford factor. Therefore, this category of employees appears to be the first in terms of overall employee absenteeism (the only exception is the average duration of absence per incident). Regarding seniority, the middle age categories (10 to 39 years of employment in total)

are quite close in terms of the frequency of absence and the percentage of employees who were absent per category. However, the category of employees with 20 to 29 years of service had the highest average length of absence per incident and duration of sickness absence, followed by the category of 0 to 9 years of employment (whose employees were absent more rarely but their sick leaves were longer in duration). Regarding the Bradford factor, the employee group with 20 to 29 years of service is in the highest category first. The same category has the most lost days. Finally, a comparison between the results from previous studies using the same methodology was conducted (see Table 3).¹⁶⁻¹⁷

Table 3: Comparison of absenteeism in previous years (2001, 2007, 2022)

Categories	2001	2007	2022
Work population (n)	281	329	391
Male (n)	211	231	212
Female (n)	70	98	179
Work group (n)			
A (n)	67	99	87
B1 (n)	84	109	145
B2 (n)	33	37	27
B3 (n)	40	38	51
B4 (n)	29	39	38
C (n)	28	7	43
Mean age (years)	46.12	46.14	51.77
A: sick leave by certificate (n)	219	133	252
B: sick leave by health committee (n)	110	102	304
Γ: sick leave by solemn declaration (n)	150	106	282
1st quarter incidents (n)	131	96	247
2nd quarter incidents (n)	120	65	213
3rd quarter incidents (n)	84	72	151
4th quarter incidents (n)	144	108	227
Percentage % of receiving sick leave (%)	55%	40%	70.5%
Number of receiving sick leave (n)	155	134	276
Did not receive sick leave (n)	126	195	115
Range of duration of sick leaves (n)	1 – 199	1 - 214	1 - 221
Median (n)	1	6	6
Mean (n)	348.97	297.88	476.6

It should be mentioned that the COVID-19 pandemic was a new disease which started as a respiratory disease, in particular, was a factor that affected absenteeism and was not present in the previous studies. Because of that, it is possible that a larger number of sickness incidents occurred in a single year, mostly respiratory tract infections.

Regarding the comparison with the past two studies, the age of permanent municipal employees increased gradually, with a predominance of males (though declining). The largest group is consistently that of cleaning employees. There is a large increase in the

average age of employees in the latest study compared to the previous two studies.

In terms of sick leave, there was a large increase in incidences in the latest study, almost twice as much as in the first and more than twice as much as in the second. Regarding the method of receiving sick leave, while all increased in absolute number in the most recent study, there was a statistically significant difference in receiving sick leave with a medical certificate ($p<0.001$) and approval of sick leave by a health committee ($p<0.001$), while receiving sick leave with a solemn declaration did not present a statistically significant difference. The timing of

sick leave also did not differ, with the majority of sick leave received in the first and last quarters of the year (winter and autumn months), and no statistically significant difference in time taken for sick leave across quarters between studies.

Lastly, there was a statistically significant difference in the percentage of employees who were absent from work in one year ($p < 0.001$),

Discussion

Comparing the results with the relevant literature, musculoskeletal and psychiatric reasons were found to be less common than reported as reasons for granting sick leave.¹¹ The female gender was statistically more likely to receive sick leave more often, a tendency that is similar to reported studies and literature.¹³⁻¹⁴ Regarding female employees, even if the total number of sick days per sick leave incident was lower than that of their male co-employees, such absences can disrupt the operational flow of the Municipality of Keratsini, especially when they are absent due to illness.

Statistical significance in increased absenteeism among experienced employees was also observed, consistent with the relevant literature.¹³

It is also observed, though not statistically significant, that older employees and administrative employees are more often absent; however, employees aged 36-55 years and those working in the cleaning section (the largest numerical group) received the most long-term sick leave. There is a notable increase in the average age of the workforce compared with the two previous studies (conducted before the economic crisis) and with the results for the cleaning personnel, all of which align with relevant literature.^{9,14}

The findings of the present study highlight the significant burden experienced by municipal employees, particularly cleaning workers (category B1), who, despite being absent less frequently, record a longer average absence duration. This observation, combined with the

with a statistically significant increase in the percentage of absentees in the last study. By extension (and due to an increase in the sample in absolute terms), there was an increase in the number of lost working days, sick leave incidents, all forms of sick leave received, and also the mean Bradford Score, which is consistent with the results mentioned above.

reference to burnout as one of the fundamental root causes of absenteeism, is corroborated by recent literature, which directly correlates exposure to occupational environmental hazards, such as noise, with a decline in quality of life and the onset of occupational burnout.¹⁸

Furthermore, the present research underscores the impact of external health and economic crises on the aging of the local government workforce and the subsequent increase in absenteeism rates. This systemic vulnerability of organizations to crises is also evident at the broader health policy level, as decision-making during crises decisively influences the operations and political economy of Greek public sector entities.¹⁹

To address this multifactorial phenomenon, the current study emphasizes the imperative need to closely monitor absenteeism through specialized indicators, such as the Bradford Score, and to implement active intervention by occupational health services. This quantitative approach is fully aligned with modern methodologies, in which the use of Key Performance Indicators (KPIs) has proven fundamental to evaluating and optimizing Occupational Health and Safety systems.²⁰

Concurrently, corresponding field studies in other demanding sectors of the Greek public system demonstrate that the institutional and substantial strengthening of occupational health services significantly contributes to the prevention of accidents and diseases.²¹ These data strongly support our proposition that the systematic recording of the phenomenon using

quantitative indicators and the support of employees through targeted wellness programs are key to mitigating the negative consequences of absenteeism.

Conclusion

The phenomenon of sickness absence in the workplace, apart from affecting employees as individuals, has social and even greater economic impacts on businesses and social insurance agencies. The reduction of productivity and the increase of health cost, rehabilitation cost and replacement – overtime cost is of a scale that surpasses the businesses and could be a national burden.

Therefore, it is suggested that absenteeism should be closely monitored in every business and organization. This way, the employees who are most absent could be identified and receive help, because some are in need. The root could be poor leadership, burnout, or workplace harassment, all serious problems that can be resolved through organizational intervention. Because employees may not always self-report these issues, return-to-work interviews with supervisors or occupational physicians are vital. Identifying patterns allows for the prediction and prevention of future absences. A pattern of absenteeism can even be spotted, and as a result, work absence can sometimes be predicted and, in many cases, prevented. The role of occupational health services should be upgraded, either in the

form of wellness programs in the workplace (e.g. back support program – ergonomic support in businesses that involve heavy lifting, seminars on burnout, sexual harassment or mental illness) or consulting and supporting employees with chronic absenteeism, also using Key Performance Indicators to track progress. Moreover, health monitoring and screening—including blood tests, imaging, and audiograms tailored to job-related risks—should be implemented alongside workplace assessments such as noise-level measurements. Finally, general health measures are not to be neglected, including using face masks when being sick, programmed vaccinations and general workplace hygiene. So, the negative effects can be reduced to a minimum.

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