



## Original Article

## Shift Work and Occupational Stress in Police Officers



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## ABSTRACT

**Background:** Shift work has been associated with occupational stress in health providers and in those working in some industrial companies. The association is not well established in the law enforcement workforce. Our objective was to examine the association between shift work and police work-related stress.

**Methods:** The number of stressful events that occurred in the previous month and year was obtained using the Spielberger Police Stress Survey among 365 police officers aged 27–66 years. Work hours were derived from daily payroll records. A dominant shift (day, afternoon, or night) was defined for each participant as the shift with the largest percentage of total time a participant worked (starting time from 4:00 AM to 11:59 AM, from 12 PM to 7:59 PM, and from 8:00 PM to 3:59 AM for day, afternoon, and night shift, respectively) in the previous month or year. Analysis of variance and covariance were used to examine the number of total and subscale (administrative/professional pressure, physical/psychological danger, or organizational support) stressful events across the shift.

**Results:** During the previous month and year, officers working the afternoon and night shifts reported more stressful events than day shift officers for total stress, administrative/professional pressure, and physical/psychological danger ( $p < 0.05$ ). These differences were independent of age, sex, race/ethnicity, and police rank. The frequency of these stressful events did not differ significantly between officers working the afternoon and night shifts.

**Conclusion:** Non-day shift workers may be exposed to more stressful events in this cohort. Interventions to reduce or manage police stress that are tailored by shift may be considered.

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## 1. Introduction

Shift work is common in many occupations, including those of police officers and other emergency responders. There is increasing evidence that shift work is associated with cardiovascular disorders, including myocardial infarction and ischemic stroke [1–4]. Numerous underlying mechanisms have been proposed to explain causal relationships between shift work and cardiovascular disease (CVD) [4–8]. Shift work may be directly related to increased risk for CVD due to circadian disturbance or misalignment between work time and an individual's internal circadian system [6], or indirectly

related to CVD through several pathways such as work-related psychological and behavioral disorders [7].

A number of prospective studies have provided evidence that work stress is a risk factor for CVD [9–12]. Peter et al [13] found that work stress explained the effects of shift work on cardiovascular risk factors such as hypertension and atherogenic lipids. Later, Puttonen et al [7] proposed occupational stress as one of the pathways mediating the association between shift work and CVD. Although previous studies have compared differences in work stress between shift and non-shift workers [14–17], work stress as well as shift structure may vary by occupation. Police officers, in

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particular, appear to be exposed to a higher level of stressors [18,19] and exhibited greater risk of CVD [20] and a more adverse CVD risk factor profile [21].

Spielberger et al [22] classified police stressors into three categories: administrative and professional pressures, physical and psychological dangers, and lack of support within and outside the police organization. The frequency of these stressors may be dependent on many factors including their work shift, police rank, and duty location, and may fluctuate throughout the year.

Determining the frequency of each stressor encountered by shift working police officers may be of vital importance for developing effectively tailored stress management programs. Current programs provide approaches to dealing with stress in general or are targeted for acute incidents, i.e., critical incident management program. This approach may reduce the effectiveness of stress interventions for police officers [23]. The objectives of the present study were to investigate (1) whether the number of overall police work-related stressful events that occurred in the previous month and year varied across shift type, and (2) whether a similar pattern was apparent for subscales of police stress including administrative/professional pressure, physical/psychological danger, and lack of organizational support.

## 2. Materials and methods

### 2.1. Source of data

Data were collected between 2004 and 2009 as part of the Buffalo Cardio-Metabolic Occupational Police Stress study, a cross-sectional study with a primary focus on assessing whether police work-related stress was associated with subclinical CVD and metabolic outcomes. All 710 active duty police officers from the Buffalo, New York Police Department (New York, NY, USA) were invited to participate in the study. Pregnant officers ( $n = 2$ ) were excluded from examinations. Of the 464 officers examined, 99 were excluded due to missing values for either shift work or police stress, generating a sample of 365 officers (265 men, 100 women). Each officer provided informed consent. The study was approved by the State University of New York at Buffalo Internal Review Board and the National Institute for Occupational Safety and Health Human Subjects Review Board.

### 2.2. Police stress assessment

Work stress was assessed using the Spielberger Police Stress Survey [22]. This survey is a 60-item self-report questionnaire designed to assess acute and chronic stress in police officers. For each of the 60 items, each participant was asked to estimate the frequency with which they experienced the event in the previous month and year. The frequency of each item was categorized as 0, 1, 2, 3–5, 6–9, 10 + times in the previous month and 0, 1, 2–5, 6–10, 11–24, and 25 + times in the previous year. Factor analysis of this survey was conducted previously by Spielberger et al [22] and generated three stress subscales based on the amount of variance accounted for by each factor. These three subscales were administrative and professional pressure (23 items), physical and psychological danger (24 items), and lack of support (13 items). The administrative/professional pressure captures the stress from the judicial system, public criticism toward police officers, performance and rewards imbalance, work and family conflicts, and low job control and decision making. Physical/psychological threats include dangerous situations such as responding to a felony in progress, exposure or witness of death and severe injury, high-speed chases, personal insults, and night shift work. Lack of support assesses the stress from strained relations with supervisors, coworkers, and

non-police friends, inadequate support within the department, and political pressure within and outside the department.

### 2.3. Shift work information

Work information during the 1 year prior to the date of examination was derived from a database of payroll records for each participant. Officers were assigned to one of three fixed schedules implemented by the Police Department beginning in 1994; however, officers may also work other shifts as necessary, such as court appearance or being a substitute for a sick coworker during a scheduled day off. Day shift started between 4:00 AM and 11:59 AM (62.1% of the day shift workers started work at 7:00 AM, and 37.9% at 8:00 AM), the afternoon shift was between 12:00 PM and 7:59 PM (all afternoon shift workers started work at 4:00 PM), and the night shift was between 8:00 PM and 3:59 AM (all night shift workers started work at 8:00 PM). The typical work schedule included 4 days of work, 4 days off work, 4 days of work, and 3 days off work. The total number of work hours as well as hours worked on each shift during the year prior to the date of examination were calculated for each participant, and were standardized to a weekly basis. A dominant shift (day, afternoon, or night) was assigned to each participant based on the largest percent time a police officer worked on a specific shift schedule during the previous year. Similarly, a dominant shift in the previous month was also assigned to each participant according to the participant's largest percent time worked on a specific shift during the previous month.

### 2.4. Demographic information

Information on sex, age, marital status, race/ethnicity, rank, and workload were obtained from a self-report questionnaire. Workload was estimated by each officer based on the perception of the work activity levels in the district in which he/she served. The workload was considered high in an area that had many complaints and a high crime rate; it was moderate if there was a moderate number of complaints and an average crime rate; and it was low if the district was not busy, and had a low crime rate.

### 2.5. Statistical analysis

Descriptive statistics were used to characterize the study population. Due to the small number, Hispanics ( $n = 7$ ) were combined with whites. Police rank was collapsed into two groups: Patrol officers versus others including higher ranks such as Sergeant, Lieutenant, Captain, and Detective. Where mean frequencies for the three subscales for police stressors were reported, the original categorical version for the number of times a participant experienced a particular event during the previous month and year was converted to a numeric version with 0, 1, 2, 4, 7.5, and 10 values for the previous month and 0, 1, 3.5, 8, 17.5, and 25 values for the previous year.

Analysis of variance (ANOVA) and analysis of covariance (ANCOVA) were used to compare the unadjusted and adjusted mean number of stressful events that occurred in both the previous month and year for officers who worked on different shifts. Variables that were associated with both shift work and police work stress including age, sex, race/ethnicity, and police rank, and were considered as potential confounders for adjustment. Multiple comparisons were also made for the frequency of stressors between afternoon shift versus day shift, night shift versus day shift, and afternoon shift versus night shift. All analyses were conducted using SAS 9.3 (SAS Institute, Cary, NC, USA).

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