Longitudinal association between cancer diagnosis and engaging in a secondary occupation among Florida's firefighters: analysis of the Annual Cancer Survey cohort data 2016-2018

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Background

- male and female Florida firefighters. Over the years, studies have found an increased risk of certain cancers among firefighters than the general US population[1]
- Cancer among firefighters have been associated with their occupational exposures to chemicals and carcinogenic agents as firefighters[2]
- However, firefighters work in shift and a significant proportion of firefighter's report engaging in secondary occupations which are often shift work such as nursing, EMT, construction, e.t.c. Shift work is associated with disruption of the circadian rhythm in humans
- Biologic associations have been found to prove that disruption of the circadian rhythm in humans is associated with cancer development[3]
- In this study, using a cross lagged panel model we assessed the longitudinal association between engaging in a secondary occupation and cancer diagnosis among

Annual Cancer Survey data

The Annual Cancer Survey is a cohort study of firefighters in Florida, managed by the Firefighter Cancer initiative program. Where firefighters are followed up yearly.

Methods

A total of 244 male and female firefighters, 18 to 65 years old in active service followed up for 3 years (2016-2018) were included in this analysis. A cross lagged panel model was used to examine the longitudinal reciprocal relationship between engaging in a secondary occupation in the past 12 months and cancer diagnosis in the last 12 months. The cross lagged panel model estimates how engaging in a secondary job and cancer diagnosis are associated conditioning on a autoregressive path. Series of regression equations were estimated simultaneously controlling for age, gender and education. Stationarity type restrictions was tested, and age, gender and education confounding effect. Model fit statistics showed excellent fit for CFI/TLI. Estimated paths and their significance is reported.

Methods by which secondary occupations can increase the risk of cancer among firefighters

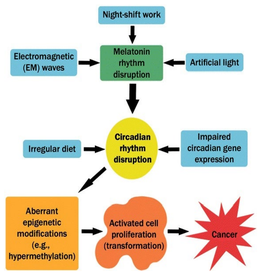

Figure 1: Disruption of Circadian rhythm

Figure 2: Additional Chemical exposures

Results

Table 1: Demographics of study participants from the Annual Cancer Survey of Florida's firefighters

Characteristics	Time1 n, (%)	Time2 n, (%)	Time 3 n, (%)
Age			
Less than 40 years	153 (68.0)		
40 years and older	71 (32.0)		
Gender			
Male	222 (91.0)		
Female	22 (9.0)		
Education			
Less than high school	5 (2.2)		
Highschool graduate	146 (59.8)		
Greater than high school	92 (37.9%)		
Cancer diagnosis			
Yes	21 (9.0)	9 (4.0)	5 (2.0)
No	203 (90.6)	215 (96.0)	218 (97.0)
Secondary occupation			
Yes	156 (69.0)	160 (69.9)	166 (72.8)
No	68 (29.6)	69 (30.1)	62 (27.2)

Nb: Gender, education was the same at the 3 time points

Figure 3: Cross lagged Panel Model of having a secondary occupation and cancer diagnosis

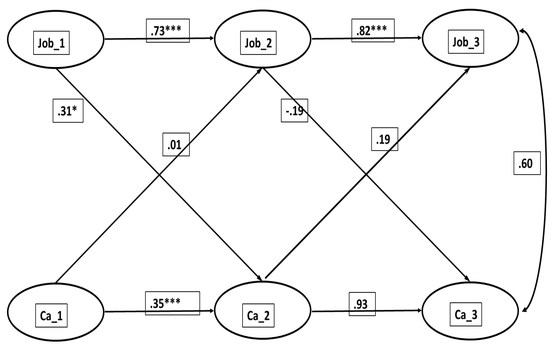

Table2: Cross lagged model

Models	Time 1	Time 2	Time 3
Standardized beta coefficients (SE)			
Job on job		0.733***	0.822***
Cancer on cancer		0.350***	0.934***
Job on cancer		0.312*	-0.199
Cancer on job		0.010	0.189
Unstandardized beta coefficients and (SE)			
Job on job		2.356 (0.236) ***	1.209 (0.264) ***
Cancer on cancer		1.373 (0.381) ***	1.959 (0.884) ***
Job on cancer		0.774 (0.369) *	-0.323 (0.391)
Cancer on job			0.360 (0.210)

*P<.05, **P<.01, ***P<.0001

Conclusion

Among Florida firefighters, engaging in a secondary occupation in the last 12 months, was positively associated with engaging in a secondary occupation subsequently. Having a previous diagnosis of cancer is positively associated with cancer diagnosis subsequently and engaging in a secondary occupation prior is positively associated with cancer diagnosis at subsequent time. However, this association was negative at the later time point. This suggests that firefighters who engage in a secondary occupation in the last 12 months are more likely to engage in a secondary occupation subsequently and those who engage in secondary occupation are likely to have a cancer diagnosis at the subsequent time point after which they seem to be no longer at risk. More studies is required in a larger cohort observed over a longer period to understand the effects of secondary occupation on cancer diagnosis among firefighters. Studies may in addition focus on specific secondary occupations that increase risk

References

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