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Health and Well-Being Factors Associated With International Business Travel

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Background. International travel by US business travelers is continuing to increase with the globalization of the economy. The objective of this study was to determine if the frequency and duration of international business travel is associated with differences in travelers' health and well-being. This study expands our limited knowledge of the impact of long-haul travel on healthy lifestyle choices and traveler's perceptions of their health and well-being.
Methods. 12,942 unique health risk appraisal (HRA) records of US employees of a multinational corporation were analyzed according to self-reported (objective and subjective) travel history and lifestyle habits.
Results. Comparing 2,962 international travelers and 9,980 non-travelers, international business travel was significantly associated with a lower body mass index, lower blood pressure, excess alcohol consumption, sleep deprivation, and diminished confidence to keep up with the pace of work.
Conclusions. This study demonstrated both positive and negative associations on the health risks and well-being of a large sample of US-based international business travelers from an US multinational company. This study identifies targeted areas for pretrip screening and counseling to proactively address potential negative effects of travel and may assist in the design of corporate travel health and employee assistance programs.

In 2006, over 8 million US citizens traveled internationally on business. The majority (61%) traveled alone, taking an average of 4.7 trips/year, and stayed a mean of 15.4 nights outside of the United States.[1] While the traditional risks relating to travel such as infectious disease, jet lag, high-risk behaviors while abroad, and environmental impacts have been extensively studied, there is limited knowledge regarding the actual or perceived impact on the traveler's overall health status and healthy lifestyle choices.

Companies invest considerable resources in international travel with the expectation of significant business benefit. Often, key talent and senior leaders are the most frequent international travelers and conduct complex and demanding business upon arrival at their destination. Yet, if travelers experience diminished health, well-being, and energy in the short- or long-term due to these travel demands, they may be less engaged and less effective in their missions. The goal of this study is to expand our knowledge about the impact of international travel on employees' actual or perceived health status and to suggest a targeted approach to pretravel advice and support given to individuals and populations in a corporate setting.

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Methods

In 2006, a validated health risk appraisal (HRA) developed by the University of Michigan Health Management Research Center[2] was made available to 25,432 US employees of a US multinational corporation; 13,409 (52.7%) participated and their records were available for analysis. The HRA included an integral informed consent, objective (eg, physical attributes, total cholesterol levels, height, weight, etc. . .) and self-reported, subjective (eg, dietary habits, blood pressure, life satisfaction, mental/emotional well-being, etc. . .) measures of health. Hypertension is defined by

Table 1 Demographics of the international business travelers

Demographic	Zero travel 0 trips/year $n = 9{,}980$	1–5 int. trips/year and <5 days/trip $n = 1{,}729$	1–5 int. trips/year and >5 days/trip $n = 983$	>6 int. trips/year and <5 days/trip $n = 168$	>6 int. trips/yr & >5 days/trip $n = 82$
Age (average)	40.22	41.81	41.60	43.20	42.45
Gender (%)					
Male	42.74	54.14	51.27	66.67	59.76
Female	57.26	45.86	48.73	33.33	40.24
Marital status (%)					
Married	72.88	79.94	76.67	85.54	70.37
Single	16.49	10.67	16.77	7.83	13.58
Other	10.63	9.38	10.56	6.63	16.05
Race (%)					
Caucasian (non-Hispanic)	80.32	82.97	76.22	92.86	86.42
Black (non-Hispanic)	8.91	5.41	4.90	1.19	3.70
Hispanic	2.57	2.27	4.29	2.98	4.94
Asian or Pacific Islander	6.92	8.60	12.35	2.98	4.94
American Indian/Alaskan Native	0.30	0.12	0.20	0.00	0.00
Other	0.99	0.64	2.04	0.00	0.00

the American Heart Association (AHA) as an adult with a systolic pressure of 140 mm Hg or higher and/or a diastolic pressure of 90 mm Hg or higher.[3] Information on travel destination (eg, international or domestic), frequency (number of trips per year), and duration (days away from base) were also collected as part of the demographics; these responses were used to divide employees into non-traveler and traveler groups and further categorize them into subgroups based on frequency and duration of travel. All personal identifiers were removed. A total of 380 duplicate records (2.8%) were removed from the dataset and 87 (0.65%) records were excluded due to incomplete or conflicting information (eg, failure to provide age, height, weight, and entry errors), leaving a final study population of $n = 12{,}942$ records (96.5%). Body mass index (BMI) was calculated using standard methods (kg/m^2).

Linear and Logistic Regression Models

Linear regression was used to evaluate the relationship between international travel and BMI. Logistic regression was used to analyze the subjective HRA responses. BMI in the linear regression and log of odds ratios (OR) in the logistic regression were modeled as functions of the predictive variables; specifically, the variable of our interest, which is the combined associations of frequency and duration of international travel, while adjusting for the effect of the control variables (age, gender, marital status, and race). p Values less than 0.05 are considered statistically significant. All statistical analyses were performed using JMP Software (version 7.0; SAS Institute Inc., Cary, NC, USA).

Results

Survey Response Demographics

A total of 9,980 people comprised the "Zero travel" group (Zero international trips), 1,729 people comprised the "Low frequency and low duration" group (1–5 international trips/y and <5 d/trip), 983 people comprised the "Low frequency and high duration" group (1–5 international trips/y and >5 d/trip), 168 people comprised the "High frequency and low duration" group, and 82 people comprised the "High frequency and high duration" group (>6 international trips/y and >5 d/trip). The frequency and duration groups were chosen pragmatically based on how the travel data questions were structured within the HRA (Table 1).

Objective Health Measures

A positive relationship was observed between international travel and BMI (Table 2). Those in the low frequency and low duration groups had significantly lower BMIs averaging 0.43 kg/m^2 [95% confidence interval (CI) = −0.67–−0.19, $p < 0.01$] than employees who did not travel. Increased trip duration (>5 d) was associated with an even lower BMI 0.5 kg/m^2 (95% CI = −0.80–−0.20, $p < 0.01$) in comparison to the zero travel group. Contrary to the overlying trend of the subjective health measures, there was no trend observed for increased frequency with low duration. Furthermore, this association was not significant in the small ($n = 82$) group of high frequency, high duration (>6 trips per year and >5 d per trip) travelers.

Subjective Health Measures

All groups of travelers, except for the high frequency, high duration group, had lower blood pressure than those who did not travel at all. There was a considerable dose-response trend with frequent (>6 times/y) international travelers having an OR for hypertension of 0.34 (95% CI = 0.17–0.61). Self-reported systolic and diastolic blood pressure was quantified and if either (systolic or diastolic) met these criteria, the subject was classified as hypertensive.

Table 2 Significant odds ratios for health measures and international business travel

Measure of health	Sample size Yes/total (%) $n = 12,942$	1–5 int. trips/year and <5 days/trip OR (95% CI)	1–5 int. trips/year and >5 days/trip OR (95% CI)	>6 int. trips/year and <5 days/trip OR (95% CI)	>6 int. trips/year and >5 days/trip OR (95% CI)
BMI (kg/m^2)	N/A	−0.43 (<0.01)* (−0.67 to −0.19)	−0.5 (<0.01) (−0.80 to −0.20)	—†	—
High blood pressure	1,342/11,477‡	0.7 (<0.01) (0.58–0.84)	0.77 (0.03) (0.60–0.97)	0.34 (<0.01) (0.17–0.61)	—
High total cholesterol	1,805/11,001	—	—	—	—
No low-fat nutrition	3,557/9,377	—	0.85 (0.04) (0.73–0.99)	—	—
No consistent physical activity	5,265/7,673	—	—	—	—
Drink over limit	1,217/11,725	1.27 (0.01) (1.07–1.50)	1.35 (0.01) (1.09–1.67)	1.63 (0.02) (1.06–2.45)	—
Smoke cigarettes	403/12,535	0.60 (0.01) (0.41–0.86)	—	—	—
Less than 8 h of sleep per night	9,833/3,102	1.24 (<0.01) (1.09–1.41)	—	1.56 (0.03) (1.04–2.43)	—
Migraine headache	1,311/11,498	—	1.35 (0.01) (1.09–1.66)	—	—
Back pain	1,932/10,891	0.74 (<0.01) (0.63–0.86)	—	—	—
Taking mood medication	586/11,701	0.66 (0.01) (0.49–0.88)	—	—	—
Frequently anxious & depressed	6,794/6,142	—	—	0.71 (0.04) (0.52–0.98)	—
No perceived flexibility in fulfilling commitment	852/12,073	—	—	1.93 (0.01) (1.15–3.06)	—
No confidence in keeping up with the pace of work	908/12,003	1.49 (<0.01) (1.23–1.79)	1.39 (0.01) (1.08–1.76)	2.32 (<0.01) (1.45–3.55)	—
Low job satisfaction	4,724/7,995	—	—	—	—
Low life satisfaction	3,687/9,251	—	—	—	—
Weak social ties with friends	627/12,310	—	1.61 (<0.01) (1.23–2.08)	—	—

All results compared to the zero travel group.
OR = odds ratio; BMI = body mass index.
*The p values are not multiplicity adjusted.
†Not significant (based on p value < 0.05).
‡Not all numbers tallied to total sample size due to minor data gaps in some individual records.

Several negative associations were observed between frequency and duration of travel and self-reported measures of health status and lifestyle choices. Although there was one exception, the high frequency, high duration cohort did not show any significance for any of the health measures because this group contained a small number of business travelers ($n = 82$); statistically, it may not have been a large enough sample size to offset the zero travel group it was compared to. All other groups of international business travelers had a higher OR of alcohol consumption over the recommended limit[4] (1–2 drink equivalents per day for men and 1 per day for women), with the high frequency, low duration travel group having the highest OR of 1.63 (95% CI = 1.06–2.05). Those who traveled less frequently and had low travel duration had an OR 1.24 (95% CI = 1.09–1.41) of failing to get the recommended amount of sleep (8 h per night; average of 7–9 h for adults),[5] as compared to their non-traveling peers; the high frequency travel group with the same duration showed an even greater OR of 1.56 (95% CI = 1.04–2.43) having a sleep deficit. International business travelers also reported a lack of confidence in their continued ability to keep up with the pace of work; there was also a notable dose response observed with the highest odds observed among the high frequency, short duration group OR 2.32 (95% CI = 1.45–3.55). Again, frequency of travel, as opposed to duration of travel, was the most significant driver associated with these adverse health effects.

A wide variety of health outcomes and healthy behaviors were similar between all traveler subgroups and the control group. Self-reported overall health status and specific conditions such as back pain and migraine headaches were no different between groups. Healthy behaviors such as adequate physical activity (3–5X/wk 30 min sessions) and adherence to a low-fat diet were similar between groups. Satisfaction with life, work, and physical health status (eg, inconsistent physical activity and high total cholesterol levels) did

not differ significantly between groups (Travelers vs non-travelers).

Discussion

Little is known about the impact of frequent or prolonged travel on the perceived health status, lifestyle choices, and personal risks of travelers. The risk factors for psychological stress among business travelers have been studied by Striker and colleagues in a study of 498 global business travelers at the World Bank.[6] In that study, more than one third of travelers reported high to very high travel stress. This study also showed that social and emotional concerns (such as impact of travel on family and sense of isolation) were the greatest contributors to stress, followed by health concerns. However, the highest increase in psychological stress was correlated with the heavy workload travelers faced upon return from a mission. While we did not measure stress in a similar way to Striker and colleagues,[6] our results do not suggest a significant difference in self-reported depression or anxiety; rather, they appear to be manifested as a "lack of confidence in keeping up with the pace of work." From our internal unpublished data, we know that this type of unmanaged stress can develop into a psychological problem as a result of traveling frequently abroad.

Our findings do suggest that the odds of drinking over the recommended limit are associated with an increase in the frequency of travel. Business travelers have increased access to alcohol via evening dinners and social events, access to free alcohol in airline lounges and with in-flight meals, and access to alcohol in the majority of hotels where they stay. Other contributing factors may be the use of alcohol to cope with the stresses of traveling, to pass the time if travelling alone, and peer pressure to overindulge arising from colleagues. This finding has important implications for pretrip screening for alcohol abuse and anticipatory guidance in frequent, long-haul travelers.

Sleep deprivation was also found to be a significant finding among international travelers at this multinational company. The impact of sleep deprivation on productivity, health, and safety can be considerable. In addition to the immediate effects of sleep deprivation such as decreased coordination and reaction time, impaired judgment, and decreased mental and physical performance, long-term sleep deprivation is associated with several chronic diseases such as diabetes, cardiovascular disease, obesity, and depression.[7–9] Research has shown that jet lag, a psychosocial hazard that disrupts the body's circadian rhythm, many times has a profound effect on cognitive function as well.[10]

The combination of both sleep deprivation and frequent alcohol use can have a tremendous negative impact on an individual's well-being, especially while traveling across >5 time zones. Alcohol, while widely used as a sleep aid by many travelers, has been demonstrated to reduce restorative rapid eye movement (REM) sleep and can result in daytime lethargy.[11] Both sleep deprivation and frequent alcohol use have been linked with depression and appear to be interrelated.[12] Feelings of being unable to cope with work coupled with poor sleep patterns, increased alcohol use, along with weak social ties (no significant trends observed in this study, but more prevalent in travelers) could all be associated with an increased risk of ill mental health. This risk has additional importance in the private sector because employees with mental illnesses are likely to be absent from work up to 7.5 times longer than those with a physical illness.[13] Taken together, they underscore the importance of preparing employees for the stressors that often accompany long-haul business travel to protect both health and preserve productivity.

Given this collection of findings, it may be prudent for organizations to consider formal policies or informal workgroup practices to manage expectations and workload of the traveler while he or she is away. This could include work practices such as routinely scheduling a half day to catch up on work upon return from travel, reassigning urgent work among the team while the traveler is away, and establishing preferred communication channels for appropriate escalation of urgent and important work (eg, use of telephone vs e-mail).

One might hypothesize that long-haul international travel, due to its disruptive effect on social connections, sleep, and personal health rituals can lead to a variety of unhealthy behaviors and health effects. However, in this cohort, increased frequency of travel was associated with lower BMI and blood pressure. There is a well-established relationship between lower BMI and lower blood pressure.[13] Concurrently, low-fat nutrition and physical activity are lifestyle factors that are associated with both lower BMI and lower blood pressure.[14,15] However, the data on low-fat nutrition and physical activity did not show any statistically significant trends associated with increased travel frequency or duration, and thus cannot explain the self-reported lower BMI and lower blood pressure. Our findings suggest that typical corporate travelers in this population do not have a greater need for pretrip counseling or advice on these topics than the general population.

In this population, one possible interpretation of the favorable risk profiles among travelers may be that higher risk employees do not volunteer for assignments requiring travel and those healthier employees are more likely to accept roles that require business travel. The self-selection bias suggests that fitter, more energetic individuals are more likely to apply for jobs that involve international travel. Another possibility is that managers may deselect high-risk (based on factors such as unhealthy BMI, blood pressure and/or observed low-fat nutrition and physical activity routines) employees from assignments requiring frequent travel.

Business travel has become a core competency in today's corporate environment. There is an increasing need for business travelers to learn and practice appropriate positive rituals to minimize the impact

travel could have on their health and well-being. "Traveling wisely can be defined as the ability of the worker to consider health and safety issues as an essential part of travel arrangements, to be aware of preventable consequences of air travel hazards, and to arrive at the global destination ready to make critical business decisions."[16] Lifestyle choices such as alcohol consumption, stress management, and the amount of sleep garnered while traveling on business can negatively affect both a traveler's health and well-being and productivity.

Conclusion

To maximize health, performance, and return on investment, both companies and travel health practitioners should have a complete understanding of the impact of international travel on employees' health and well-being. In this study population, the risk of smoking, fitness, unhealthy diet, and poor job satisfaction were no greater among travelers than controls. Screening for excessive alcohol use, education on the effects of alcohol, and teaching coping mechanisms to avoid overuse may be beneficial among corporate travelers. Similar attention should be given to the importance of establishing successful sleep rituals while traveling and consideration of pharmacologic sleep aids among high-risk populations. Finally, health providers should advise organizations to consider realistic workloads for business travelers or practices that promote flexible working, clear prioritization, recovery time, and other interventions that help employees keep up with the pace of work while maintaining a stressful travel schedule. These findings help to fill an important knowledge gap for travel health practitioners serving corporate customers, but may not be able to be generalized to all corporate settings.

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Declaration of Interests

The authors state that they have no conflicts of interest.

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