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Original Article

Comparison of the Risk for Peripheral Vertigo between Physicians and the General Population

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Abstract

Background: Because of the limited information available regarding peripheral vertigo (PV) in physicians, we conducted this study to clarify this issue.

Methods: We used Taiwan National Health Insurance Research Database to identify 26,309 physicians and an identical number of general population matched by age and sex. All the participants who had PV before 2007 and residents were excluded. By tracing their medical histories between 2007 and 2013, comparisons of PV risk between physicians and general population and among physicians were performed.

Results: Physicians had a significantly lower PV risk than the general population (adjusted odds ratio [AOR]: 0.811; 95% confidence interval [CI]: 0.662–0.994). In comparison among physicians, otolaryngologists had a significantly higher PV risk than other specialties. Physicians who were older or served in local hospitals or clinics had a significantly higher PV risk than physicians in medical centers.

Conclusion: Physicians had a significantly lower PV risk than the general population. Better medical knowledge in physicians than in the general population may explain the findings; however, further studies are warranted for elucidating the detailed mechanisms.

Keywords: Benign paroxysmal positional vertigo; Peripheral vertigo; Physician

Introduction

Peripheral vertigo (PV) is an important problem for public health all over the world. PV, known as one type of dizziness, is the illusion of motion, which is usually the motion of rotation. The common subtypes of PV are Meniere's disease, benign paroxysmal positional vertigo (BPPV), vestibular neuronitis, and labyrinthitis (1). In 80% of affected individuals, PV leads to medical requirements, interfering with daily life, and sick leave (1). The lifetime prevalence of PV has been reported to be

7.8%, the 1-year prevalence as 5.2%, and the incidence of 1.5% (2). In Taiwan, 527,807 adult patients experienced vertigo, which indicated a prevalence of 3.13% (3). Within one year, 37.7% of them experienced recurrence and the prevalence and recurrence of vertigo increased with age (3).

Physicians have high work stress and responsibility during shift work or on-call duties, which are related to an increased risk of developing PV (4-6). An earlier had study reported that patients with BPPV had significantly more stressful life events than their healthy counterparts (4). However, physicians have lower risks for certain diseases, including acute myocardial infarction, stroke, peptic ulcer disease, and urolithiasis, than the general population, due to their better medical knowledge and easy access to medical care (7-10). However, when we searched PubMed and Google Scholar using the keywords "vertigo", "physician", and "dizziness" we could not find any study regarding PV in physicians. Besides, whether physicians have a higher or lower risk for PV than the general population is still unknown.

Therefore, we conducted this retrospective nationwide population-based cohort study to clarify this issue.

Methods

Data sources

Two subsets from the Taiwan National Health Insurance Research Database were used for this study: 1) 2009 Registry for medical personnel (PER) and 2) the Longitudinal Health Insurance Database 2000 (LHID2000). Taiwan has a single-payer National Health Insurance program, which comprised 99.9% of Taiwan's population including foreigners in 2014 (11). The database of this program contains registration files and original claim data for reimbursement. Large, computerized databases derived from this system by the National Health Insurance Administration, Ministry of Health and Welfare, Taiwan, and maintained by the National Health Research Institutes, Taiwan, are provided to scientists in Taiwan for research purposes.

Identification of physicians and general population

After matching for age and sex, an identical number of physicians and general population were identified from the PER and LHID2000, respectively. Participants who had PV (ICD-9-CM code: 386.0, 386.1, 386.3) before 2007 or residents were excluded. Residents were excluded due to a very short exposure time in work, which may not reflect the effect of their occupations. Age subgroups were divided as <35, 35–50, 50–65, and >65 years. Past histories were defined as head injury (ICD-9-CM code: 850, 852, 853, 854, 959.0, 959.01, 959.09), otitis media (ICD-9-CM code: 055.2, 381, 382), diabetes (ICD-9-CM code 250), hypertension (ICD-9-CM code: 401–405), hyperlipidemia (ICD-9-CM code: 272), stroke (ICD-9-CM code: 436–438), coronary artery disease (ICD-9-CM code: 410–414), congestive heart failure (ICD-9-CM code: 428), chronic pulmonary obstructive disease (ICD-9-CM code: 496), liver disease (ICD-9-CM code: 570–576), renal disease (ICD-9-CM code: 580–593), and mental disorder (ICD-9-CM code: 290–319), which were possible confounding factors for this study. Monthly income was defined at three levels: <20,000, 20,000–40,000, and ≥40,000 (New Taiwan Dollars, NTD). Levels of employed hospitals were defined as medical centers, regional hospital, local hospitals, and clinics (12). Physician specialties were classified into internal medicine, surgery, obstetrics and gynecology (ob/gyn), pediatrics, emergency medicine, family medicine, otolaryngology, and other specialties. Overall, 26,309 physicians and 26,309 individuals from the general population were identified for the study.

Comparison of PV risk between physicians and the general population and among physician subgroups

We compared the PV risk between physicians and the general population and among physician subgroups by following up on their medical histories between 2007 and 2013s. Subgroups analysis for PV, including Meniere's disease, BPPV, vestibular neuronitis, and labyrinthitis, and stratified analysis for age and sex subgroups were also performed.

We also compared the PV risk among physician subgroups including specialties, age, sex, and level of employed hospital.

Ethics statement

This study was strictly conducted according to the Declaration of Helsinki and was approved by the Institutional Review Board at Chi Mei Medical Center. Because this nationwide database contains de-identified information, informed consent from the participants is waived. This waiver does not affect the right and welfare of the participants.

Statistical analysis

We used independent *t*-test for continuous variables and chi-square test for categorical variables in the comparison of demographic characteristics, past histories, and monthly income between physicians and general population. In the comparison of PV risk between physicians and general population, we used conditional logistic regression analysis by adjusting for head injury, otitis media, diabetes, hypertension, hyperlipidemia, stroke, coronary artery disease, congestive heart failure, chronic obstructive pulmonary disease, liver disease, renal disease, mental disorder, and monthly income. Firth's conditional logistic regression was also performed for adjusting the effect of rare event. In the comparison among physician subgroups, we used unconditional logistic regression analysis by adjusting for age, sex, past histories of head injury, otitis media, diabetes, hypertension, hyperlipidemia, stroke, coronary artery disease, congestive heart failure, chronic obstructive pulmonary disease, liver disease, renal disease, mental disorder, and monthly income. SAS 9.4 for Windows (SAS Institute, Cary, NC, USA) was used for all analyses. The significance level was set at 0.05 (two-tails).

Results

We identified 26,309 physicians and 26,309 age- and sex-matched individuals as the general population (Table 1). The mean age (± standard deviation) was 44.87 ± 12.35 yr in both the physicians and the general population. Regarding age subgroups, 27.39% of them were aged <35 yr, 39.66% were aged 35–50 yr, 27.28% were aged 50–65 yr, and 5.66% of them were aged >65 years. Most physicians were male (83.71%). Physicians had significantly higher past histories of hypertension (20.59% vs. 17.21%), hyperlipidemia (23.17% vs. 15.28), coronary artery disease (8.82% vs. 7.99%), chronic obstructive pulmonary disease (21.14% vs. 17.14%), liver disease (33.49% vs. 27.17%), renal disease (10.22% vs. 8.66%), and mental disorder (24.33% vs. 22.95%), but they had lower past histories of head injury (3.19% vs. 9.59%), otitis media (9.19% vs. 9.26%), diabetes (8.81% vs. 9.69%), stroke (2.32% vs. 2.79%), and congestive heart failure (0.96% vs. 1.68%) than the general population. Physicians had significantly higher monthly income than the general population. 27.06%, 23.76%, 20.99%, and 28.19% of the physicians were employed in medical centers, regional hospitals, local hospital, and clinic, respectively. In Taiwan, the level of medical institutions is classified as medical center, regional hospital, local hospital, and clinic by the hospital evaluation. During the study period between 2007 and 2013, the cumulative incidence rates of PV in physicians and general population were 1.38% and 1.56%, respectively (Table 2). Physicians had a significantly lower PV risk than did the general population (adjusted odds ratio [AOR]: 0.811; 95% confidence interval [CI]: 0.662–0.994). Firth's conditional logistic regression showed a similar result (OR: 0.885; 95% CI: 0.769– 1.020, AOR: 0.815; 95% CI: 0.668–0.998). Analysis of subgroups of PV between the physicians and general population showed that physicians had a significantly lower risk for BPPV (AOR: 0.620; 95% CI: 0.391–0.982); however, there was no significant difference in other subgroups of PV, including Meniere's disease, vestibular neuronitis, and labyrinthitis.

Table 1: Demographic characteristics and comorbidities of physicians and general population

Characteristic	*Physicians (n = 26309)*	*General population (n = 26309)*	*P-value*
Age (yr)	44.87 (12.35)	44.87 (12.35)	>0.9999
Age (yr)			>0.9999
<35	7207 (27.39)	7207 (27.39)	
35–50	10435 (39.66)	10435 (39.66)	
50–65	7177 (27.28)	7177 (27.28)	
>65	1490 (5.66)	1490 (5.66)	
Sex			>0.9999
Male	22022 (83.71)	22022 (83.71)	
Female	4287 (16.29)	4287 (16.29)	
Past history			
Head injury	839 (3.19)	2522 (9.59)	<0.0001
Otitis media	2399 (9.12)	2174 (9.26)	0.0005
Diabetes	2319 (8.81)	2550 (9.69)	0.0005
Hypertension	5416 (20.59)	4529 (17.21)	<0.0001
Hyperlipidemia	6096 (23.17)	4020 (15.28)	<0.0001
Stroke	611 (2.32)	735 (2.79)	0.0006
Coronary artery disease	2321 (8.82)	2102 (7.99)	0.0006
Congestive heart failure	252 (0.96)	443 (1.68)	<0.0001
Chronic obstructive pulmonary disease	5561 (21.14)	4509 (17.14)	<0.0001
Liver disease	8810 (33.49)	7149 (27.17)	<0.0001
Renal disease	2688 (10.22)	2278 (8.66)	<0.0001
Mental disorder	6402 (24.33)	6037 (22.95)	0.0002
Monthly income (NTD)			<0.0001
<20,000	812 (3.09)	9782 (37.18)	
20,000–40,000	652 (2.48)	10514 (39.96)	
≥40,000	24845 (94.44)	6013 (22.86)	
Level of employed hospital			
Medical center	7120 (27.06)		
Regional hospital	6252 (23.76)		
Local hospital	5521 (20.99)		
Clinic	7416 (28.19)		

Data are number (%) or mean ± SD. NTD, New Taiwan Dollars

Physicians in the age subgroup of 50–65 yr also had a significantly lower PV risk than the general population (AOR: 0.486; 95% CI: 0.357–0.663). In contrast, physicians in the age subgroups of <35 yr and 35–50 yr had a nonsignificantly higher PV risk than the general population (AOR: 1.888; 95% CI: 0.864–4.122 and AOR: 1.408; 95% CI: 0.982–2.020, respectively). Physicians in the age subgroup of >65 yr had a nonsignificantly lower PV risk than the general population (AOR: 0.592; 95% CI: 0.327–1.072). Stratified analysis by sex showed that physicians of both sexes had a nonsignificantly lower PV risk than that of the general population.

Comparison among physician subgroups showed that the specialty of otolaryngology had a significantly higher PV risk than other specialties (AOR: 4.249; 95% CI: 3.001–6.017) (Table 3). Specialties of ob/gyn and family medicine had a nonsignificantly higher PV risk than other specialties (AOR: 1.478; 95% CI: 0.969–2.255 and AOR: 1.412; 95% CI: 0.953–2.091, respectively). When physicians became older, the PV risk significantly increased. There was no significant difference in the PV risk between male and female physicians. Physicians employed in clinics and local hospitals had a higher PV risk than did physicians employed in medical centers (AOR: 1.555; 95% CI: 1.116–2.167 and AOR: 1.406; 95% CI: 1.001–1.977, respectively).

Table 2: Comparison of risk for peripheral vertigo between physicians and general population by conditional logistic regression analysis

Variable	*Number (%)*	*OR (95% CI)*	*AOR (95% CI)**
Overall analysis			
Physicians	363 (1.38)	0.883 (0.766–1.019)	0.811 (0.662–0.994)
General population	410 (1.56)	1	1
Subgroup analysis			
Meniere's disease			
Physicians	76 (0.29)	0.894 (0.655–1.219)	0.810 (0.523–1.256)
General population	85 (0.32)	1	1
BPPV			
Physicians	60 (0.23)	0.810 (0.576–1.140)	0.620 (0.391–0.982)
General population	74 (0.28)	1	1
Vestibular neuronitis			
Physicians	84 (0.32)	1.183 (0.862–1.624)	1.131 (0.713–1.793)
General population	71 (0.27)	1	1
Labyrinthitis			
Physicians	6 (0.02)	1.000 (0.322–3.101)	1.058 (0.188–5.939)
General population	6 (0.02)	1	1
Stratified analysis			
Age subgroup			
<35 yr			
Physicians	57 (0.79)	1.241 (0.840–1.833)	1.888 (0.864–4.122)
General population	46 (0.64)	1	1
35–50 yr			
Physicians	153 (1.47)	1.397 (1.092–1.788)	1.408 (0.982–2.020)
General population	110 (1.05)	1	1
50–65 yr			
Physicians	115 (1.60)	0.592 (0.469–0.748)	0.486 (0.357–0.663)
General population	192 (2.68)	1	1
>65 yr			
Physicians	38 (2.55)	0.603 (0.400–0.909)	0.592 (0.327–1.072)
General population	62 (4.16)	1	1
Sex subgroup			
Male			
Physicians	315 (1.43)	0.972 (0.831–1.136)	0.858 (0.688–1.069)
General population	324 (1.47)	1	1
Female			
Physicians	48 (1.12)	0.553 (0.388–0.789)	0.603 (0.351–1.037)
General population	86 (2.01)	1	1

AOR, adjusted odds ratio; CI, confidence interval; BPPV, benign paroxysmal positional vertigo. *Adjusted for past histories of head injury, otitis media, diabetes, hypertension, hyperlipidemia, stroke, coronary artery disease, congestive heart failure, chronic obstructive pulmonary disease, liver disease, renal disease, mental disorder, and monthly income

Table 3: Comparison of risk for peripheral vertigo among physician specialties by unconditional logistic regression analysis

Variable	*Number (%)*	*OR (95% CI)*	*AOR (95% CI)**
Specialty			
Surgery	35 (1.09)	0.925 (0.630–1.358)	0.981 (0.666–1.445)
Internal medicine	82 (1.27)	1.084 (0.811–1.448)	1.171 (0.874–1.571)
Ob/gyn	28 (1.78)	1.531 (1.006–2.329)	1.478 (0.969–2.255)
Pediatrics	22 (1.04)	0.887 (0.559–1.406)	0.956 (0.600–1.523)
Emergency medicine	5 (0.73)	0.623 (0.253–1.532)	0.883 (0.354–2.199)
Family medicine	34 (1.68)	1.441 (0.977–2.126)	1.412 (0.953–2.091)
Otolaryngology	50 (4.52)	3.993 (2.837–5.620)	4.249 (3.001–6.017)
Other specialties	107 (1.17)	1	1
Age subgroup (yr)			
<35	57 (0.79)	1	1
35–49	153 (1.47)	1.867 (1.375–2.534)	1.671 (1.221–2.286)
50–64	115 (1.60)	2.043 (1.484–2.811)	1.686 (1.193–2.382)
≥ 65	38 (2.55)	3.284 (2.170–4.969)	2.552 (2.568–4.153)
Sex			
Male	315 (1.43)	1.281 (0.944–1.739)	1.011 (0.735–1.391)
Female	48 (1.12)	1	1
Level of employed hospital			
Medical center	62 (0.87)	1	1
Regional hospital	80 (1.28)	1.476 (1.057–2.059)	1.271 (0.907–1.782)
Local hospital	87 (1.58)	1.823 (1.313–2.529)	1.406 (1.001–1.977)
Clinic	134 (1.81)	2.095 (1.547–2.836)	1.555 (1.116–2.167)

AOR, adjusted odds ratio; CI, confidence interval. *Adjusted for age, sex, past histories of head injury, otitis media, diabetes, hypertension, hyperlipidemia, stroke, coronary artery disease, congestive heart failure, chronic obstructive pulmonary disease, liver disease, renal disease, mental disorder, and monthly income

Discussion

This study showed that physicians had a significantly lower PV risk than did the general population. Physicians in the age subgroup of 50–65 yr had a significantly lower PV risk than did the general population in the same age subgroup; however, younger physicians (aged <35 yr and 35–50 yr) had a nonsignificantly higher PV risk than that of the general population. Otolaryngologists had the highest PV risk than other specialties. The older the physicians were, the higher the PV risk was. There was no significant difference in the PV risk between male and female physicians. Regarding of the level of employed hospital, physicians who worked in clinics and local hospitals had a significantly higher PV risk than those who worked in medical centers.

Better medical knowledge and easy access to medical care could contribute to the significantly lower PV risk among the physicians than that of the general population and the lowest PV risk among physicians working in medical centers than physicians working in local hospitals and clinics. Physicians had nearly half the risk for acute myocardial infarction than did the general population (AOR: 0.57; 95% CI: 0.46–0.72) and physicians working in medical centers had a significantly lower risk for acute myocardial infarction than did physicians working in local clinics (AOR: 0.42; 95% CI: 0.20–0.85) (7). Physicians had a lower risk for stroke than did the general population (AOR: 0.61; 95% CI: 0.55–0.66) (8). Compared with the general population, nurses, and other healthcare workers had a significantly higher risk for peptic ulcer disease (odds ratio [OR]: 1.477; 95% CI: 1.433–1.521

and OR: 1.328; 95% CI: 1.245–1.418, respectively), whereas physicians did not (OR: 1.029; 95% CI: 0.987–1.072) (9). The work stress in nurses and other healthcare workers may explain the higher risk for peptic ulcer disease; however, physicians' better medical knowledge may protect them from peptic ulcer, although they are also high-stress healthcare workers (9). Similar findings on urolithiasis, showed that physicians had a lower urolithiasis risk than did the general population (AOR: 0.682; 95% CI: 0.634–0.732) and other healthcare workers (AOR: 0.661; 95% CI: 0.588–0.742) (10). Although physicians had a significantly lower PV risk than the general population, younger physicians had a trend for higher PV risk when compared with the general population of the same age. We cannot make any conclusion on this phenomenon because this is beyond the scope of this study. Further studies about the detailed mechanism are suggested.

The reason for the highest PV risk among otolaryngologists among the physician specialties may be that they had better ability to diagnose themselves as PV than other physician specialties. Some physicians who were not otolaryngologists may choose self-treatment without visiting a specialty for a definite diagnosis because it is strongly embedded within the culture of physicians as an accepted way to enhance work performance (13,14). In addition to stress, several comorbidities may be related to PV; for example, diabetes, mild head injury, and sinus disease are very common in BPPV (15). Other risk factors for PV are age, female sex, lower educational level (2), hypertension, osteoarthrosis, osteoporosis, and depression (16). Therefore, education, regular control, and reduction of the risk factors for PV including stress, diabetes, head injury, sinus disease, hypertension, osteoarthrosis, osteoporosis, and depression are recommended for decreasing the incidence of PV.

Although this is the first study regarding PV in physicians, there were some limitations. First, there was no detailed information about the levels of stress and medical knowledge, and the severity of PV in the participants, which may affect the causal relationship for the result in this study. Further studies are warranted to clarify this issue. Second, we collected the data only between 2007 and 2013, which may not be long enough. Longer follow-up may be needed to validate our result. Third, lifestyles including food and living environment were not available in this study. Better lifestyle may also explain the lower PV risk in physicians than in the general population. Finally, although this was a nationwide study, our results may not be generalizable to other nations due to the differences in race, culture, and occupation workload.

Conclusion

Physicians had a significantly lower PV risk than that of the general population. Physicians working in medical centers had a significantly lower PV risk than physicians working in local hospitals and clinics. Better medical knowledge and access to medical care may play the role. When physicians became older, the PV risk increased. There was no significant difference in PV risk between male and female physicians. In the comparison among physician specialties, otolaryngologists had the highest PV risk, which may be explained by the fact that they had better ability to diagnose themselves; however, further studies about the underlying mechanisms are warranted.

Ethical considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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Conflicts of interest

No conflicts of interest were declared.

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