Original Article

Relationships between Hand Diseases and Seven Lifestyle Dimensions

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Objective: To analyze the relationships between seven lifestyle dimensions (eating, living, sleeping & rest, sexual activity, communication, working, and learning) and three common hand diseases (carpal tunnel syndrome [CTS], trigger finger, and de Quervain's disease). These relationships were analyzed from two perspectives: whether each lifestyle dimension affects any of the diseases and whether each disease affects any off the lifestyle dimensions.

Materials and Methods: A cross-sectional study was conducted with 80 patients who had been diagnosed with CTS, trigger finger, or de Quervain's disease during 2015 and 2016. The 7 lifestyle dimensions [7LSD] questionnaire and the Thai version of the Disabilities of the Arm, Shoulder and Hand [DASH] questionnaire were used to evaluate the patients. The association between each of the diseases and the 7 lifestyle dimensions as well as the correlation between the 7LSD questionnaire and DASH score were analyzed.

Results: The living dimension affected CTS and de Quervain's disease and the working dimension affected trigger finger ($p<0.05$). On the other hand, all three diseases affected the living dimension and CTS affected the sleeping & rest dimension ($p<0.05$). The correlation between the 7LSD questionnaire and DASH score regarding the extent to which each disease affected the lifestyle dimension was moderate correlated ($p<0.05$).

Conclusion: There is a relationship between hand diseases and three of the 7 lifestyle dimensions: the living, working, and sleeping and rest dimensions.

Keywords: Lifestyle, Carpal tunnel syndrome, Trigger finger, de Quervain's disease, Hand diseases, 7-lifestyle dimensions

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Hand and wrist diseases have been described as being work-related, particularly the three most common problems observed in outpatient clinics: carpal tunnel syndrome [CTS], de Quervain's disease and trigger finger[1-6]. However, work is considered to be just one of several lifestyle dimensions as people do not use their hands only for working[7].

Often diseases are studied in depth and with specificity without sufficient consideration of potential connections to human lifestyles which could be a contributing factor. That situation negatively impacts the development of health promotion guidelines for prevention of the diseases rather than treatment.

The present study analyzed the relationships between lifestyle and hand diseases. Lifestyle was divided into seven dimensions encompassing the general aspects of daily life including eating, living, sleeping & rest, sexual activity, communication, working, and learning. Each dimension was analyzed in two aspects: whether each lifestyle dimension affects any of the diseases, and whether each disease affects any of the lifestyle dimensions.

Materials and Methods

A cross-sectional study was conducted with 80 patients who had visited the orthopedics outpatient

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clinic with hand problems between 2015 and 2016. The inclusion criteria were patients who had been diagnosed with CTS, trigger finger or de Quervain's disease. The exclusion criteria were previous surgery, a history of trauma, congenital anomalies, associated diseases such as rheumatoid arthritis, connective tissue disease or posttraumatic arthritis in the hand region, and unwillingness to participate. A total of 43 patients were diagnosed with trigger finger, 26 with CTS and 11 with de Quervain's disease. The 7 lifestyle dimensions [7LSD][8] questionnaire and the Thai version of the Disabilities of the Arm, Shoulder and Hand [DASH] questionnaire score[9] were used to evaluate the patients. The study was approved by the institutional review board and all patients signed an informed consent.

The 7LSD questionnaire was used to evaluate whether each lifestyle dimension affects any of the diseases, and whether each disease affects any of the lifestyle dimensions. The 7LSD questionnaire consists of seven questions related to aspects of human lifestyle including eating, living, sleeping & rest, sexual activity, communication, working and learning. Each item was scored from 1 (least affected) to 5 (most affected), making a possible total score of 35. The 7LSD questionnaire responses and the DASH scores were converted to a maximum of 100 by sum of number responses divided by number of items, subtract 1 and multiply by 25.

Data on age, gender, body mass index [BMI], duration of the disease, comorbidities, affected hand, and dominant hand were also obtained (Table 1).

Statistical analysis

For demographic data, continuous data are presented as mean and SD, while categorical data are shown as a percentage. Normality of the distribution was evaluated using the Kolmogorov-Smirnov test. Associations between disease and lifestyle dimensions as well as lifestyle dimensions and diseases were analyzed by Chi-square test. Pearson's correlation was used to evaluate the association between the 7LSD questionnaire and the DASH score. The *p*-values <0.05 were considered statistically significant.

Results

The mean ages of CTS, trigger finger and de Quervain's disease patients were 59.4, 55.4 and 52.6 years, respectively. Most of the patients were female: 88.5% of the CTS patients, 76.7% of the trigger finger patients, and 100% of the de Quervain's disease patients. The mean BMI of all three groups was greater than 25, which is classified as overweight.

Lifestyle affecting diseases

The dimension of living was statistically significantly associated with CTS and de Quervain's disease, with scores of 3.35 and 4.27, respectively ($p<0.05$), while the dimension of working was statistically significantly associated with only trigger finger with a score of 2.67 ($p<0.05$). There were no statistically significant associations between wrist and hand diseases and the dimensions of eating, sleeping & rest, sexual activity, communication or learning (Table 2).

Diseases affecting lifestyle

CTS, trigger finger, and de Quervain's disease were statistically significantly associated with the dimension of living with scores of 2.96, 2.21 and 2.73, respectively ($p<0.05$). CTS was statistically significantly associated with the dimension of sleeping & rest, with a score of 2.69 ($p<0.05$). There were no statistically significant associations between CTS and the dimensions of eating, sexual activity, communication, working or learning. Neither trigger finger nor de Quervain's disease were statistically significantly associated with the dimensions of eating, sleeping & rest, sexual activity, communication, working or learning (Table 3).

7LSD questionnaire and DASH score

For data analysis, patients were divided into two groups according to the pathology of their disease: compressive neuropathy [CTS] and tendinopathy (trigger finger and de Quervain's disease). The correlation between the 7LSD questionnaire and the DASH score regarding whether each of the diseases was associated with the lifestyle dimensions was statistically significant for both the compressive neuropathy group ($r = 0.56$, $p = 0.0028$) and the tendinopathy group ($r = 0.475$, $p = 0.0003$). However, the 7LSD questionnaire regarding whether each of the lifestyle dimensions affected the diseases showed no statistically significant correlation to the DASH score (Table 4 and 5).

Discussion

The present study shows that the living dimension of lifestyle was significantly associated with CTS and de Quervain's disease. The role of the living dimension is more varied than the other 6 dimensions

Table 1. Demographic data of patients with three common hand diseases

	Carpal tunnel syndrome (n = 26)	Trigger finger (n = 43)	de Quervain's disease (n = 11)
Age (mean)	59.35 (40 to 86)	55.42 (37 to 82)	52.64 (43 to 63)
Gender (female) (%)	23 (88.5)	33 (76.7)	11 (100)
BMI (kg/m^2) (mean)	27.51 (18.73 to 36.29)	25.36 (19.05 to 32.85)	25.82 (19.62 to 32.8)
Duration			
<3 months	5	17	1
3 to 6 months	5	9	3
6 to 12 months	2	8	3
>1 year	14	9	4
Comorbidities			
Diabetes mellitus	8	5	2
Hypertension	11	11	6
Renal disease	1	0	0
Hyperlipidemia	9	10	2
Affected hand			
Right	16	26	6
Left	7	14	5
Bilateral	3	3	0
Dominant hand			
Right	24	41	9
Left	2	2	2

Table 2. Correlation between the 7LSD questionnaire and three common hand diseases indicating how lifestyle dimensionsare associated with disease

Lifestyle affecting disease score (mean)			
7 lifestyle dimensions	Diseases		
	Carpal tunnel syndrome	Trigger finger	de Quervain's disease
Eating	1.00	1.00	1.00
Living	3.35*	2.58	4.27*
Sleep & rest	1.15	1.07	1.00
Sexual activity	1.00	1.00	1.00
Communication	1.35	1.47	1.18
Working	3.08	2.67*	2.91
Learning	1.54	1.79	1.36

* *p*-value <0.05

as many diverse daily life activities are included such as cleaning, washing, cooking, and other home duties, all of which involve heavy use of hands in various motions and directions. The repetitive use of hand and wrist may be related to CTS, particularly wrist spasms while grasping[4]. Repeated wrist bending and movement involving twisting are also significantly related to to work-related factorswhich can cause de Quervain's disease[3].

The position of the wrist is also important, in particular, extending the wrist more than 32.7°, flexing the wrist more than 48.6°, ulnar deviation of more than 14.5°, and radial deviation of more than 21.8° for two hours or more will increase the pressure in the carpal tunnel, resulting in the median nerve becoming edematous and causing demyelination[10].

Table 3. Correlation between the 7LSD questionnaire and three common hand diseases indicating how the diseases are associated with lifestyle dimensions

Disease association with lifestyle score (mean)			
7 lifestyle dimensions	Diseases		
	Carpal tunnel syndrome	Trigger finger	de Quervain's disease
Eating	2.23	1.26	1.27
Living	2.69*	2.21*	2.73*
Sleep & rest	2.69*	1.84	2.36
Sexual activity	1.00	1.00	1.00
Communication	1.19	1.16	1.00
Working	2.31	1.67	2.00
Learning	1.54	1.35	1.00

* p-value <0.05

Table 4. Correlation between the 7LSD questionnaire (how lifestyle is associated with disease) and DASH score

	7LSD questionnaire (mean) lifestyle association with disease	DASH (mean)	p-value
Carpal tunnel syndrome	19.5	11.5	0.36
Trigger finger and de Quervain's disease	17.2	7.31	0.21

Table 5. Correlation between 7LSD questionnaire (disease association with lifestyle) and DASH score

	7LSD questionnaire (means) Disease association with lifestyle	DASH (means)	p-value
Carpal tunnel syndrome	23.8	11.5	0.0028
Trigger finger and de Quervain's disease	13.1	7.31	0.0003

Laoopugsin studied anatomical differences of hands and found that smaller hand spans and less grip strength were related to CTS, trigger finger, and de Quervain's disease[4].

In the working dimension, occupation and avocation were found to be significantly associated with trigger finger. This result is similar to a previous study of work-related disease which found that the specific posture of the hand in wrist spasms while grasping increases the risk of developing trigger finger[4].

Many studies of work-related disease have found that repetitive work patterns while bearing a load in the hand and wrist were related to an increased risk of developing de Quervain's disease[4], and that prolonged use of hand-held vibrating tools doubles the risk of CTS. Prolonged repetitive flexion and extension of the wrist with a forceful grip also results in a higher risk of CTS[2]. However, the present study found no significant relationship between the working dimension and either CTS or de Quervain's disease.

There is no evidence supporting the association of office workers, particularly computer users, with trigger finger. Similarly, many studies have found no association between computer users and CTS[2,11].

CTS, trigger finger, and de Quervain's disease were all significantly associated with the living dimension of lifestyle. As mentioned earlier, this might be the result of the wide variety of activites involved in

daily living. Patients suffering from each of these three hand diseases had limited function in their living activities. Therefore, in addition to standard treatment, lifestyle modification and using auxiliary equipment may be necessary for patients to maximize the efficacy of their physical movements and to enhance their quality of life.

Keogh et al in a study of the impact of work-related upper extremity cumulative trauma disorders including CTS, trigger finger, and de Quervain's disease, found that most injured workers had difficulty performing simple activities of daily living, impacting home life even more than work[12].

The present study found that CTS was significantly associated with the sleeping and rest dimension. That is not surprising as nighttime numbness is the key characteristic of CTS[13]. Other than that, the symptom is more affected to sleep quality in CTS patients. Previous studies have shown that CTS patients have higher sleep disturbance and insomnia scores than patients without CTS. In addition, CTS is correlated with reduction of sleep quality and interferes with daytime functioning[14,15].

Although the present study found that sleeping is not associated with CTS, a previous study reported that sleeping in the lateral position is associated with the presence of CTS, increased wrist deviation, increased pressure in the carpal tunnel and compressed median nerve[16].

The DASH score is widely used to evaluate upper extremity diseases. In order to establish the reliability of the 7LSD questionnaire, the present study examined the correlation between DASH scores and the 7LSD questionnaire. The correlation of DASH scores and the 7LSD questionnaire was significant for diseases affecting lifestyle both through compressive neuropathy and tendinopathy. The Pearson's correlation coefficient was moderately correlated.

Although the eating dimension of lifestyle was not statistically significantly associated with any of the diseases, previous studies have found obesity and higher BMI to be associated with CTS[1,17-19]. The mean BMI in the present study was higher than 25 which is categorized as overweight or obese. The authors suggests that the eating dimension, a major factor in obesity, should be a main focus of concern rather than the BMI, which is the outcome of eating, i.e., people should be educated to adjust their eating behavior in order to prevent obesity.

The present study revealed no significant association between sexual activity and disease, either the effect of sexual activity on diseases or the effect of diseases on sexual activity. However, a previous study reported that obesity, macromastia, and large chest circumference increase pressure from repeated use of the wrist during sexual activity and might be associated with CTS[20]. As with sexual activity, the communication and learning dimensions showed no significant correlation with any of the three diseases.

One limitations of this study is that itwas a cross-sectional study, so it was not possible to evaluate patient behavior throughout the course of the disease. Also, itis not possible to guarantee that the sample is representative of the general population. A second limitation isthat the validity of the 7LSD questionnaires was note valuated. A third limitation is that data on the severity of the diseases was not obtained. Nevertheless, the present study did identify aspects of two directional relationships between these common hand diseases and lifestyle, not just relationships in a single direction.

Conclusion

The present study found a correlation between lifestyle and three common hand diseases in two dimensions: whether each lifestyle dimension is associated with the disease, and whether each disease is associated with each lifestyle dimension. The results show that livin*g* dimensionis associated with both CTS and de Quervain's disease and that the working dimension is associated withtrigger finger. In addition, all three diseases are associated with the living dimension and CTS is associated with the sleeping & rest dimension. These results could be beneficial to efforts to educate people in terms of health promotion and disease prevention even though some dimensions of lifestyle are not associated with diseases. Additional longitudinal study will be required to gain further understanding of the correlations and to establish the cause and effect relationships between human lifestyle and hand diseases.

What is already known on this topic?

Most of the previously published articles studied the correlation between the three common hand diseases and work-related factors without considering other lifestyle dimensions.

What this study adds?

The present study reveals the correlation between seven lifestyle dimensions and three common hand diseases, identifying aspects of how each lifestyle dimension is associated with the diseases,

and how each disease is associated with the lifestyle dimensions.

Potential conflicts of interest

The authors declare no conflict of interest.

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ส่วนที่ 1: แบบสอบถามเพื่อประเมินความสัมพันธ์ของมิติต่าง ๆ ของวิถีชีวิตต่อโรคที่เป็น

มิติของวิถีชีวิตมีผลต่อโรคที่ท่านเป็นอย่างไร	*ผลกระทบ*				
	น้อยมาก (1)	*น้อย* (2)	*ปานกลาง* (3)	*มาก* (4)	*มากที่สุด* (5)
1. *การกินเช่น การใช้ช้อน, ส้อม, ตะเกียบ มีผลต่อโรคที่ท่านเป็นหรือไม่*					
2. *การอยู่อาศัยเช่น ทำงานบ้าน, กิจวัตรประจำวัน*					
3. *การพักผ่อน/นอนหลับเช่น กิจกรรมยามว่าง, ท่าทางการนอน, มีอาการขณะนอนหลับหรือหลังตื่นนอน*					
4. *มีสัมพันธ์กับคนรักเช่น ท่าทางขณะมีสัมพันธ์กับคนรัก, มีอาการขณะมีสัมพันธ์กับคนรัก*					
5. *การสื่อสารเช่น การใช้โทรศัพท์, แทปเล็ต*					
6. *การทำงาน (หมายถึงงานที่ก่อให้เกิดรายได้) เช่น งานที่ต้องใช้มือ หรือข้อมือซ้ำ ๆ*					
7. *การเรียนรู้เช่น การเขียนหนังสือ, การประดิษฐ์หรือการเรียนรู้งานหัตถกรรมต่าง ๆ*					

ท่านคิดว่าวิถีชีวิตมิติใดที่มีผลต่อโรคที่ท่านเป็นมากที่สุด.....

เหตุผล หรือ ยกตัวอย่างประกอบ..... .....

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ส่วนที่ 2: แบบสอบถามเพื่อประเมินความสัมพันธ์ของโรคที่เป็นต่อวิถีชีวิตในแต่ละมิติ

โรคที่ท่านเป็นมีผลต่อวิถีชีวิตในแต่ละมิติอย่างไร	*ผลกระทบ*				
	น้อยมาก (1)	*น้อย (2)*	*ปานกลาง (3)*	*มาก (4)*	*มากที่สุด (5)*
1. การกิน เช่น โรคที่ท่านเป็นมีผลต่อการใช้ช้อน, ส้อม, ตะเกียบหรือไม่, ท่านรู้สึกไม่สะดวกสบายขณะรับประทานอาหารหรือไม่					
2. การอยู่อาศัย เช่น ท่านทำงานบ้าน, กิจวัตรประจำวันได้ลดลงเพราะอาการของโรคที่ท่านเป็น					
3. การพักผ่อน/นอนหลับ เช่น โรคที่ท่านเป็นมีผลต่อการนอนหลับ, นอนไม่หลับ, ตื่นกลางดึก					
4. มีสัมพันธ์กับคนรัก เช่น ท่าทางขณะมีสัมพันธ์กับคนรัก, มีอาการขณะมีสัมพันธ์กับคนรัก, ระยะเวลา หรือความถี่ในการมีสัมพันธ์กับคนรักลดลง					
5. การสื่อสาร เช่น ท่านใช้งานโทรศัพท์, แทปเล็ตได้ลดลง					
6. การทำงาน (หมายถึงงานที่ก่อให้เกิดรายได้) เช่น ท่านทำงานที่ต้องใช้มือ หรือข้อมือซ้ำๆ ได้ลดลง, ต้องหยุดงาน					
7. การเรียนรู้ เช่น การเขียนหนังสือ, การประดิษฐ์หรือการเรียนรู้งานหัตถกรรมต่างๆ					

ท่านคิดว่าโรคที่ท่านเป็นมีผลต่อวิถีชีวิตในมิติใดมากที่สุด.....

เหตุผล หรือ ยกตัวอย่างประกอบ .....

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