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The Self-administered Comorbidity Questionnaire (SCQ): A New Method to Assess Comorbidity for Clinical and Health Services Research

Ka Ling Kong[1], Shing Yee Puan[1], Kamarudin Ahmad[1, 2]

[1]*Pharmacy Department, Miri Hospital, Sarawak*

[2]*Clinical Research Centre Miri*

Corresponding author name and email: Ka Ling Kong (kongkaling@moh.gov.my)

ABSTRACT

Introduction: Comorbidity is the occurrence of one or more disease with the existence of one indexed disease. Comorbidity is associated with deteriorated physical function, reduced health-related quality of life and work participation outcome. Measures of comorbidity typically use information from the medical record or administrative data. However, it imposes limitations such as incomplete medical records, poor quality of documentation, along with its high cost. The alternative is using a self-administered measure of comorbidity for clinical and health services research settings. It allows subjects to note the severity of each comorbid condition and their perceptions of its impact on their daily routine.

Objective: To assess the type and number of comorbidities among pharmacy department staffs in Miri Hospital, and the impact of the comorbidities on their daily working performance.

Methods: This is a cross-sectional study involving 50 staffs from the pharmacy department in Miri Hospital. We adapted the Self-administered Comorbidity Questionnaire (SCQ) along with questions regarding demographic information for data

collection. The SCQ addressed 14 body systems with two binary questions regarding the occurrence of health-related conditions and whether they received treatment or medication in everyday life.

Results: A total of 50 pharmacy staffs of Miri Hospital participated in this survey study. None of the baseline characteristics (age, gender, race and working experience) had significant association with comorbidities. The majority reported back pain as one of the comorbidities experienced (52.8%) followed by others such as hypertension, lung diseases and depression and their presence is of statistically significance (p=0.001) towards working performance of the participants.

Conclusion: SCQ is a promising instrument to determine comorbidities and to understand the impact on working performance in pharmacy personnel of Miri Hospital. Comorbidities, particularly back pain, are observed to impact the working performance significantly and hence, more measures are necessary to prevent poor working performance in the future.

Keywords: comorbidity; self-administered comorbidity questionnaire; medical conditions; working performance

INTRODUCTION

Comorbidity is medical condition that coexists with the disease of interest (1). It is an important prognostic factor in deciding the overall outcome of the condition (1). Available studies worldwide showed that comorbidity might contribute to poor physical outcome, working performance as well as health-related quality of life (HRQoL) (1). Therefore, it seems crucial to be able to quantify comorbidity efficiently.

Conventionally, measurement of comorbidity obtained from either medical records or administrative data, and described as externally assessed comorbidity (1). Nevertheless, this type of approach is expensive and often limited by the accessibility of medical records as well as the quality of documentation (2). Hence, various studies have suggested to collect comorbidities information by summarising all the information into a single score by using comorbidities index (for example, Charlson Comorbidity Index (CCI)) or self-administered comorbidity questionnaires (SCQ) (3). Nevertheless, CCI requires trained medical personnel to extract data from medical charts and is time-consuming to administer (2, 3). Hence, SCQ is selected to achieve the objective of this study as the method is short and easily understood, and at the same time, it can be completed by individuals without any medical background. Additionally, the individuals can be aware of their comorbidities and consequently, perception of the impact on their work productivity.

To date, no comorbidity instrument has been evaluated among pharmacy department staffs in Miri Hospital, hampering the influence of comorbidities on health status and work participation. Thus, the present study aims to assess the type and number of comorbidities among them and the impact of the comorbidities on their daily working routine.

MATERIALS AND METHODS

Study design and population

The study design employed was a cross-sectional study. We recruited healthcare personnel (fully registered pharmacists, provisionally registered pharmacists and pharmacist assistants) in the pharmacy department of Miri Hospital. We applied convenience sampling method and distributed the questionnaires in all pharmacy units. 50 of the 60 questionnaires distributed, were adequately filled and returned. The overall response rate of 83.3%.

Study instrument

In the current study, we adapted the SCQ from a study by *Sangha et al.* (2). The SCQ (Appendix 1) requires participants to indicate if they have any of the medical conditions that might have an impact on their working performance. The medical conditions are heart disease, high blood pressure, lung disease, diabetes, ulcer or stomach disease, kidney disease, liver disease, anaemia or other blood disease, cancer, depression, osteoarthritis, back pain, rheumatoid arthritis and an option to add on other non-specified medical problems. We asked the participants to indicate each condition if it is present (yes/no) and is currently treated (yes/no). There was a total of 50 participants who completed the SCQ along with questions about demographic data (gender, age, race and years of working experience).

Statistical analysis

We analysed the data gathered using SPSS Statistics Version 21 and performed descriptive statistics, Pearson's Chi-square and Fisher's exact test. Inferential statistics with $P < 0.05$ is considered as statistical significant.

Ethical consideration

The current study was registered with the National Medical Research Register (NMRR-18-3985-45280) and ethical approval for this study obtained from the Medical Research and Ethics Committee (MREC), Ministry of Health Malaysia.

RESULTS

The study sample consisted of 50 participants, 38 (76.0%) were female, and 11 (22.0%) were male. Most of them (46.0%) were between 20 and 30 years old. The participants were predominantly Chinese (54.0%) and 39 of them (78.0%) had been working for 1 to 10 years. Table 1 displays the demographic characteristics of the study participants.

Table 1: Demographics details of participants (n=50)

Demographic characteristics		n (%)
Age	20-30	23 (46.0)
	30-40	20 (40.0)
	40-50	2 (4.0)
	50-60	5 (10.0)
Gender	Male	11 (22.0)
	Female	38 (76.0)
Race	Malay	12 (24.0)
	Chinese	27 (54.0)
	Indian	1 (2.0)
	Others	2 (4.0)
	Sabah Bumiputera	1 (2.0)
	Sarawak Bumiputera	7 (14.0)
Working Experience	1-10 years	39 (78.0)
	10-20 years	6 (12.0)
	20-30 years	4 (8.0)
	30-40 years	1 (2.0)
Medical Condition	Yes	36 (72.0)
	No	14 (28.0)

There were 36 (72.0%) of participants reported at least one medical condition. Half (n=19, 52.8%) of them had back pain followed by other comorbidities, as shown in Table 1. Additionally, some reported comorbidities that were not stated in the SCQ such as allergic rhinitis (n=2, 5.6%), dandruff (n=1, 2.8%), insomnia (n=1, 2.8%), plantar fasciitis (n=1, 2.8%) and systemic lupus erythematosus (SLE) (n=1, 2.8%).

Table 2: Comorbidity among the participants

Comorbidity	n (%)
Anemia/ other blood disease	1 (2.8)
Back pain	19 (52.8)
Cancer	0 (0.0)
Depression	2 (5.6)
Diabetes	1 (2.8)
Heart disease	1 (2.8)
High blood pressure	3 (8.3)
Kidney disease	0 (0.0)
Liver disease	0 (0.0)
Lung disease	3 (8.3)
Osteoarthritis, degenerative conditions	0 (0.0)
Others	5 (13.9)
- Allergic rhinitis	2 (5.6)
- Dandruff	1 (2.8)
- Insomnia	1 (2.8)
- Plantar fasciitis	1 (2.8)
- SLE	1 (2.8)
- Rheumatoid arthritis	1 (2.8)
- Ulcer or stomach disease	0 (0.0)

Table 3: Stratified analyses showing the influence of demographic and comorbidity among the participants

Characteristics	Comorbidity		P-value	Working performance (applicable for those with comorbidity)		P-value
	Yes	No		Yes	No	
Gender						
Female	28 (56.0)	11 (22.0)	> 0.95	15 (41.7)	13 (36.1)	0.691
Male	8 (16.0)	3 (6.0)		3 (8.3)	5 (13.9)	
Age (years)						
20-30	15 (30.0)	8 (16.0)		5 (13.9)	10 (27.8)	
30-40	15 (30.0)	5 (10.0)	0.386	8 (22.2)	7 (19.4)	0.218
40-50	1 (2.0)	1 (2.0)		0 (0.0)	1 (2.8)	
50-60	5 (10.0)	0 (0.0)		4 (11.1)	1 (2.8)	
Race						
Malay	10 (20.0)	2 (4.0)		4 (11.1)	6 (16.7)	
Chinese	20 (40.0)	7 (14.0)		8 (22.2)	12 (33.3)	
Indian	1 (2.0)	0 (0.0)	0.412	1 (2.8)	0 (0.0)	0.510
Others	1 (2.0)	1 (2.0)		1 (2.8)	0 (0.0)	
Sabah Bumiputera	0 (0.0)	1 (2.0)		0 (0.0)	(0.0)	
Sarawak Bumiputera	4 (8.0)	3 (6.0)		1 (2.8)	3 (8.3)	
Working experience (years)						
1-10	27 (54.0)	12 (24.0)		11 (30.6)	16 (4.4)	
10-20	4 (8.0)	2 (4.0)	0.536	1 (2.8)	3 (8.3)	0.318
20-30	4 (8.0)	0 (0.0)		3 (8.3)	1 (2.8)	
30-40	1 (2.0)	0 (0.0)		1 (2.8)	0 (0.0)	

Although more female reported with medical conditions than male participants, however, the difference was not statistical significant. Moreover, increased work experience did not result in a higher percentage of comorbidity experienced. The results were similar to other descriptive factors such as age and race. After considering those with the presence of medical conditions, none of the descriptive factors are statistically significant (Table 3) towards working performance in Miri Hospital.

Nonetheless, the presence of comorbidity possesses statistical significance to working performance (P=0.001) as shown in Table 4, regardless of the type of comorbidity.

Table 4: Stratified analyses showing the influence of comorbidity and medical performance among the participants

Medical conditions			**Medical performance**		**P-value**
			Yes	**No**	
Yes	Anaemia/other blood disease	1 (2.8)	0 (0.0)	1 (100)	0.001
	Back pain	19 (52.8)	8 (42.1)	11 (57.8)	
	Depression	2 (5.6)	1 (50)	1 (50)	
	Diabetes	1 (2.8)	0 (0.0)	1 (100)	
	Heart disease	1 (2.8)	1 (100)	0 (0.0)	
	Hypertension	3 (8.3)	2 (66.7)	1 (33.3)	
	Lung disease	3 (8.3)	2 (66.7)	1 (33.3)	
	Others	5 (13.9)			
	- Allergic rhinitis	2 (5.6)	1 (50.0)	1 (50.0)	
	- Dandruff	1 (2.8)	1 (100)	0 (0.0)	
	- Insomnia	1 (2.8)	1 (100)	0 (0.0)	
	- Plantar fasciitis	1 (2.8)	1 (100)	0 (0.0)	
	- SLE	1 (2.8)	0 (0.0)	1 (100)	
	Rheumatoid arthritis	1 (2.8)	1 (100)	0 (0.0)	
No	Cancer	0 (0.0)	-	-	-
	Kidney disease	0 (0.0)			
	Liver disease	0 (0.0)			
	Osteoarthritis	0 (0.0)			

DISCUSSION

Comorbidity is known to exert a significant impact upon the working performance (1); thus, we are interested in carrying out a study within pharmacy department staff in Miri Hospital to determine such relationship. Firstly, a self-administered comorbidity questionnaire (SCQ) was modified using *Sangha et al*. (2) and distributed among the participants to assess the type and number of medical conditions and their impacts on the daily working performance. SCQ is a generic, self-report questionnaire with various medical conditions, developed to adjust for the impact of comorbidity on functional status (4). In comparison to medical records data, SCQ is favourable in this study due to its feasibility to collect comorbidity data and could offer a better predicament towards quality of life in terms of working performance (4-5). Likewise, it provides practical advantages over medical record-based assessments (6).

Generally, majority of the pharmacists working in Miri Hospital reported to have experienced back pain (n=19, 52.8%) among various comorbidities stated in the SCQ (Appendix 1). Back pain is the most widely occurring musculoskeletal disorder and the lifetime incidence (at least one episode in a lifetime) in developed countries as reported to be as high (85%) (7). For example, cases of occupational lower back pain in Japan have accounted for around 60% of all occupational diseases from 1990 to 2000 (8). Of those people who experience activity limiting back pain, most will go on to have recurrent episodes (9).

Back pain is considered as a significant public health problem as its consequences are often far-reaching with sufferers experiencing varying degrees of disability and reduced quality of life as well as physical and psychological distress (7). Subsequently, these lead to lost productivity such as absenteeism, days with less than 100% productivity and overall effectiveness at work, which in turn associated with increased direct and indirect economic costs (7). In this study, we are concerned with the aspects of comorbidities whereby back pain is the most frequently reported, its impact on the working performance of the participants.

In the pharmacy field, the most frequently reported occupational risk factor for back pain is most probably due to various biomechanical components of human movement used in work (7). These include frequent bending, lifting, pulling and pushing,

repetitive work, forceful movements, static postures such as prolonged sitting and awkward postures (10-12). As such, repetitively engaging in these activities is thought to trigger or aggravate a pre-existing back disorder (13). Aziz et al. (14) supported this statement, claiming that low back pain was among prevalent occupational risk for both sitting and standing workers who work for 2 hours continuously. Prolonged sitting identified as a risk factor for low back pain, and yet, task design based on prolonged sitting has been increasing. Our personnel, need to deal with prolonged sitting all day long, which subsequently, affects their work performance significantly, as shown in our study (P=0.001).

Reduced work ability is not only costly for the individual, but also for the organisation and society due to lost productivity and compensation costs (15). Hence, various methods implemented in the hope to reduce the possibility of musculoskeletal disorders or injuries from occurring to those working in the pharmacy department. For instance, since repetitive tasks and prolonged tasks duration at static posture are the major risk factors (14), in outpatient pharmacy of Miri Hospital, rotational shiftwork on weekly basis whereby different roles (acknowledgement, screening, filling and intervention and dispensing) assigned to different personnel at different timing. This resolution has allowed the pharmacy staff to flex to their muscles and alternate their work posture, to accommodate variation in work posture thus reducing the possibilities of fatigue and thereby enhancing productivity as well as working performance within the pharmacy department.

Besides, stress can be one of the factors leading to reduced work productivity. A study conducted by Jay et al. (15) observed that stress and pain did not interact with work ability, but the effect was additive. Therefore, it is beneficial to carry out an intervention strategy which aims at reducing both back pain and perceived stress to prevent reduced work ability. Several randomised controlled trials (16-18) that performed interventional strategies reported to have experienced positive reductions in pain in the upper extremity following both strenuous and non-strenuous resistance training using both weights and elastic bands. Relaxation techniques for managing stress can help to reduce the risks of suffering a recurring back problem as well. These solutions suggested in the hope of improving working performance within the pharmacy department of Miri Hospital to achieve more significant contributions in the future.

LIMITATIONS

This study involves a small sample size as it is conducted within the pharmacy department only. Associations made between experienced comorbidities and working performance might not be representative of the general populations. Moreover, the revised SCQ has not been validated but was assessed previously by comparing with those created by Sangha et al. (2) and generally provided no issues to the participants. Furthermore, we cannot rule out the possibility of classification error made by the participants. There may be some systematic bias; for example, some may tend to report that they do or do not have a particular medical condition when the truth is the opposite. The categories of comorbidities are not mutually exclusive as well; for instance, a participant with lung cancer may classify his or her disease under lung disease or cancer, or both.

CONCLUSION

In the absence of medical records, self-administered questionnaires (SCQ) would become a valid and reliable alternative to assess comorbidities and thus, we recommend this as a tool to be included in clinical research, health policy and organisational improvement analyses (1-3). Baseline characteristics such as age, gender and race do not influence the rate of comorbidities. Nevertheless, comorbidities shown to significantly impact the working performance among pharmacy personnel of Miri Hospital. Thus, more measures must be applied in order to improve productivity in the workplace.

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CONFLICT OF INTEREST

The authors have declared no conflicts of interest.

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Appendix 1

Medical condition (s)	Do you have the problem?		Do you receive treatment for it?	
	Yes (1)	No (0)	Yes (1)	No (0)
Anaemia/other blood disease				
Back pain				
Cancer				
Depression				
Diabetes				
Heart disease				
High blood pressure				
Kidney disease				
Liver disease				
Lung disease				
Osteoarthritis, degenerative conditions				
Rheumatoid arthritis				
Ulcer or stomach disease				
Others: Please state:				