International Journal of Gerontology 13 (2019) 286–292
https://doi.org/10.6890/IJGE.201912_13(4).0005

International Journal of Gerontology

journal homepage: http://www.sgecm.org.tw/ijge/

Original Article

The Relationship Between Depression, Chronic Illnesses and Disability Among Community-Dwelling Women and Men Aged 60–80 Years: A Cross-Sectional Analysis

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ARTICLE INFO

Accepted 8 April 2019

Keywords:
aged,
chronic disease,
depressive disorder,
disability evaluation,
World Health Organization

SUMMARY

Background: Depression together with chronic diseases results in significant health deterioration. The aim of our study was to assess the relationship between depression and the most common chronic diseases and disability in the case of the older inhabitants of South-East Poland (the region of Podkarpackie).

Methods: The study population was a randomly chosen group of 1800 people aged 60 to 80 years living in South-East Poland (the region of Podkarpackie). This population was divided into subgroups: subjects without depression (1655 people, 91.94%) and subjects with depression (145 people, 8.06%). The study tool was the WHO Disability Assessment Schedule (WHODAS 2.0) and a socio-demographic questionnaire.

Results: We have found the highest proportion of patients with depression among those participants who were diagnosed with four or more chronic diseases. Patients with the highest depression values of odds ratio were those with urinary incontinence and migraine. Elderly patients with these disorders were four times more likely to suffer from depression than those without depression. A surge in disability in each domain measured by WHODAS 2.0 increased the chance of depression significantly, particularly in subjects who reported limitations in social functioning.

Conclusion: Our results have indicated urgent needs for studying the predisposition of the elderly to develop chronic diseases and depression resulting from increased disability occurring as a result of combination of these diseases. Diagnosis and treatment of depression should be a base for building standard and complex rehabilitation programmes in chronic diseases among the elderly.

1. Introduction

Depression developed together with chronic diseases results in significant health deterioration.[1] The prevalence of depression is higher in people with a greater number of developed chronic diseases.[2] A higher number of chronic diseases results in increased depression syndromes.[3] Moreover, depression develops disability and precipitates dependence in the elderly, for example in those with cardiologic disorders.[4]

The overtaken assessment of how various chronic diseases together with depression lead to the lowered functioning of health is important from the perspective of health care and social systems.[5,6] The wide prevalence of multiple disorders, administered treatment, as well as disability reduction pose a difficult challenge for the public health care.[7]

Kim and Choi indicated that the interaction between a higher level of activities of daily living (ADL) and chronic diseases was related with a lower level of depression syndromes in the case of older Korean immigrants.[3] Chiu et al. noticed a strong relationship between chronic diseases, functional state and depression syndromes. The authors stated that during classification of depression syndromes in elderly patients with several chronic diseases, one needs to consider functional deterioration in daily living activities and in autonomic abilities.[8] Stamm et al. found that the elderly have significant ADL problems and therefore, more consideration should be given to the high impact of pain, anxiety and depression on ADLs.[9] Moreover, Silva et al. pointed out that in planning health care interventions, it is necessary to consider pain, depression syndromes as well as physical activity, which is a factor preventing or reducing disability.[10]

The overall aim of the study was to assess the prevalence of depression in the studied group and its relation with functioning of people aged 60–80.

2. Methods

2.1. Design and sample of the study

This is a cross-sectional study carried out on a randomly cho-

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sen group of 1800 people aged 60 to 80 years living in South-East Poland. The study population was divided into subgroups: subjects without depression (1655 people, 91.94%) and subjects with diagnosed by a doctor depression according to International Statistical Classification of Diseases and Related Health Problems Classification (145 people, 8.06%). Random sampling from the database collected by the Ministry of Interior and Administration in Poland for each age group was made using the SPSS program version 23. The assumed confidence interval (CI) was 95% (0.95) with an estimated error of 3% (Figure 1).

The study used Pen and Paper Interviews. The criteria for subjects' inclusion were: age 60 to 80 years, cognitive state that allowed for participation in a reliable interview (abbreviated mental score, AMTS > 6 points – used as a preliminary screening test), and an informed consent to participate in the study. The interviews were conducted by suitably trained pollsters, at the participamts' places of residence. Uniform protocols of data collection have been used.

2.2. Ethical procedure

In accordance with Declaration of Helsinki, the subjects were provided with information about the aim and the course of the study, and expressed their informed consent to participate. The approval to conduct the study was obtained from the Bioethical Commission of the University of Rzeszow.

2.3. Outcome measures

The study tool consisted of the WHO Disability Assessment Schedule (WHODAS 2.0 36-item version) and a socio-demographic questionnaire. The questionnaire contained questions on: age, sex, place of residence, marital status, education, income per capita/month, social activity (understood as active participation in various community organizations), the opportunity to use other people's assistance in daily life.

The WHO Disability Assessment Schedule (WHODAS 2.0) is used to measure health, functioning and disability. It was based on the International Classification of Functioning, Disability and Health (ICF). It covers six domains of functioning: cognition (Domain 1), mobility (Domain 2), self-care (Domain 3), getting along (Domain 4), life activities – domestic responsibilities (Domain 5.1), work and school (Domain 5.2 – we did not consider this area in our study), participation – joining in community activities (Domain 6).[11] The questionnaire was translated and validated in Poland.[12] To determine the general disability level, as well as disability in individual WHODAS 2.0 domains, the following scale, in line with ICF, was used: no disability or an insufficient problem (0–4%), mild disability or a small problem (5–24%), moderate disability or a significant problem (25–49%), severe disability or a big problem (50–95%), and extreme disability or a total problem (96–100%).[13]

Additionally, we have collected data on chronic diseases which were reported by the subjects, and which required formal medical diagnosis, such as: coronary diseases, hypertension, CVA (stroke, embolism) and chronic consequences of a CVA, diabetes, osteoporosis, degenerative disease of peripheral joints, degenerative diseases of the spine, lumbar spine pain syndromes, thoracic spine pain syndromes, cervical spine pain syndromes, rheumatism, allergy, neoplastic disease, asthma, chronic respiratory diseases, gastric and

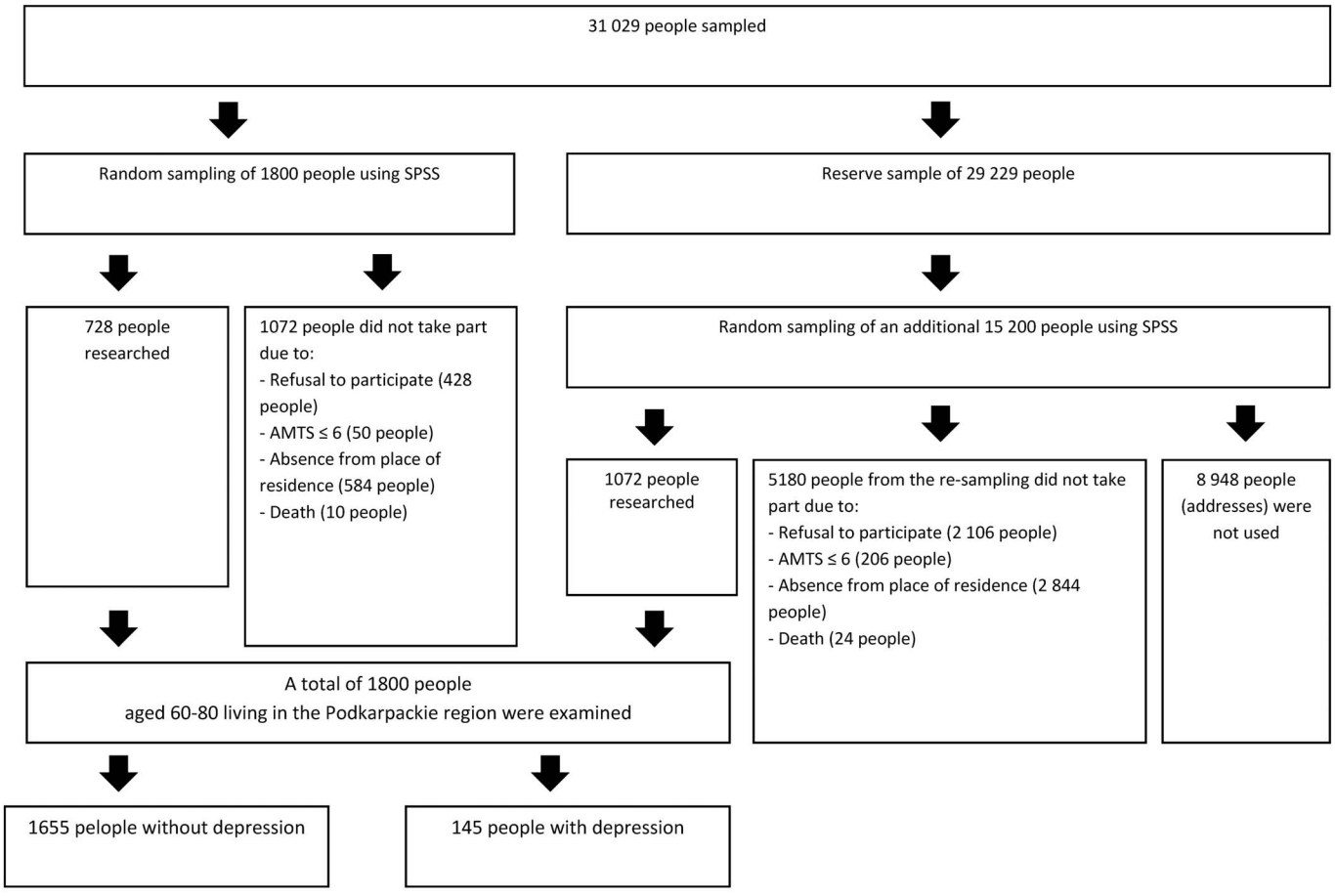

Fig. 1. Flow diagram of study in group of people aged 60–80.

duodenal ulcer disease, urinary incontinence, and migraine.

2.4. Statistical analysis

We have analyzed the collected data with the use of StatSoft, Inc. (2011) programme STATISTICA, version 10. The preliminary analysis used the chi-square test of independence. In order to assess the relationship of factors that had a significant impact on developing depression, we used a multinomial logistic regression analysis. In addition, to assess the influence of individual disability domains and diseases on developing depression, we used logistic regression. In each case, the respective odds ratio with a 90% confidence interval was determined. Statistical significance was set at $p < 0.05$.

3. Results

We did not find any relationship between depression and subjects' age ($p = 0.385$), place of residence ($p = 0.267$), their education ($p = 0.919$) or membership in at least one organization/group/association ($p = 0.302$).

The following variables differentiated our subjects in respect of developing depression: sex ($p = 0.002$), with women being diagnosed with depression more often than men (9.79% and 5.73%, respectively); marital status ($p < 0.001$) – the highest proportion of depression was in separated/divorced subjects (22.50%) while the lowest was in married/living with a partner subjects (6.75%); and level of disability ($p < 0.001$) – the percentage of subjects with depression increased with higher levels of disability (from 1.86% of subjects with no disability to 19.02% in subjects who suffered from severe or complete disability) and with barriers to social participation. The incidence of depression was significantly higher in subjects with a greater number of chronic diseases ($p < 0.001$). Definitely, the largest proportion of subjects with depression was found in the group of patients who were diagnosed with: rheumatism, cervical spine pain syndromes, lumbar spine pain syndromes, coronary diseases or angina pectoris (Table 1).

It is worth mentioning that that the risk of depression increases 1.7 times with every subsequent chronic disease. The risk of depression significantly increases with the growth of disability. With moderate disability, the risk of depression is four times as high as in subjects without disability, whereas with severe or complete disability, it is seven times higher. As for socio-demographic factors, the only relationship we found concerned marital status. Regarding divorced or separated elderly, the risk of depression was almost four times higher than in the case of married respondents (Table 2).

Speaking of a surge in disability levels in each of the domains measured by WHODAS 2.0, it significantly increases the risk of depression. It should be noticed that we observed a particularly high risk of depression in the case where an increase in disability results in obstacles limiting social participation (Domain 6). We also noticed a significant increase in the risk of depression in the case when disability affects cognition (Domain 1) and mobility (Domain 2) (Table 3).

In addition, the subjects with the highest depression odds ratio were those who complained about urinary incontinence and migraine. The elderly suffering from these conditions are four times as likely to develop depression as older participants without them. A very high risk of depression is also found in the elderly with gastric or duodenal ulcer disease, degenerative diseases of the spine, degenerative disease of peripheral joints and heart diseases. In these patients, the risk of developing depression is three times as high as in patients without them (Table 4).

4. Discussion

Our study analysed relationships between depression, chronic diseases and disability in the elderly from South-East Poland from biopsychosocial perspective. The prevalence of diagnosed depression in the study group was 8.06%. Multinomial logistic regression analysis indicated that the risk of depression increases with the number of chronic diseases and together with a surge in the disability level. Regarding the participants with chronic diseases, the highest depression odds ratio was in patients with urinary incontinence and with migraine, as well as gastric and duodenal ulcer diseases. As for a surge in disability in every domain measured by WHODAS 2.0, the risk of developing depression significantly increases. The highest risk of depression was observed when disability growth was related to limitations in social participation, as well as in cognitive functioning, mobility and life activities.

The Polish nationwide study PolSenior found that undiagnosed symptoms of depression may affect as many as 30% of the elderly. In Poland, the diagnosis of depression is often hindered by the common social belief that older age is linked to dejection and sadness.[14] The estimated depression prevalence in our study is comparable to the mean depression prevalence in the United Kingdom (8.4%).[15]

Table 1
Demographic characteristics.

Demographic characteristics (N = 1800)	No depression		Depression		*p*
	n	%	n	%	
1. Age					0.385 [a]
60–65 years	531	93.16	39	6.84	
66–70 years	398	92.56	32	7.44	
71–75 years	389	91.10	38	8.90	
76–80 years	337	90.35	36	9.65	
2. Sex					0.002 [a]
Male	724	94.27	44	5.73	
Female	931	90.21	101	9.79	
3. Place of residence					0.267 [a]
City/town	754	91.17	73	8.83	
Countryside	901	92.60	72	7.40	
4. Marital status					< 0.001 [a]
Bachelor/spinster	65	87.84	9	12.16	
Married/living with a partner	1147	93.25	83	6.75	
Separated/divorced	31	77.50	9	22.50	
Widower/widow	412	90.35	44	9.65	

Table 1. Continued

Demographic characteristics (N = 1800)	No depression		Depression		*p*
	n	%	n	%	
5. Education					0.919 [a]
Primary	577	92.32	48	7.68	
Vocational	436	92.18	37	7.82	
Secondary comprehensive	137	90.13	15	9.87	
Secondary vocational	325	91.55	30	8.45	
Tertiary	180	92.31	15	7.69	
6. Membership in at least one organization/group/association					0.302 [a]
Yes	318	90.60	33	9.40	
No	1337	92.27	112	7.73	
7. Disability level					
Total					< 0.001 [a]
None	369	98.14	7	1.86	
Mild	685	94.74	38	5.26	
Moderate	435	87.70	61	12.30	
Severe or complete	166	80.98	39	19.02	
Domain 1					< 0.001 [a]
None	713	96.09	29	3.91	
Mild	397	92.76	31	7.24	
Moderate	382	88.43	50	11.57	
Severe or complete	163	82.32	35	17.68	
Domain 2					< 0.001 [a]
None	565	96.91	18	3.09	
Mild	413	93.23	30	6.77	
Moderate	339	90.16	37	9.84	
Severe or complete	338	84.92	60	15.08	
Domain 3					< 0.001 [a]
None	1129	94.32	68	5.68	
Mild	262	89.12	32	10.88	
Moderate	153	85.47	26	14.53	
Severeorcomplete	111	85.38	19	14.62	
Domain 4					< 0.001 [a]
None	624	96.45	23	3.55	
Mild	418	90.67	43	9.33	
Moderate	280	89.74	32	10.26	
Severe or complete	333	87.63	47	12.37	
Domain 5.1					< 0.001 [a]
None	673	96.83	22	3.17	
Mild	224	92.95	17	7.05	
Moderate	321	91.98	28	8.02	
Severe or complete	437	84.85	78	15.15	
Domain 6					< 0.001 [a]
None	249	98.42	4	1.58	
Mild	605	96.49	22	3.51	
Moderate	517	89.29	62	10.71	
Severe or complete	284	83.28	57	16.72	
8. Number or chronic diseases					< 0.001 [a]
0–1	340	98.55	5	1.45	
2–3	380	96.94	12	3.06	
4 and more	935	87.96	128	12.04	
9. Chronic disease					
Coronary diseases (ischaemic heart disease) or angina pectorism	488	29.49	81	55.86	< 0.001 [b]
Hypertension	937	56.62	109	75.17	< 0.001 [b]
CVA (stroke, embolism) and chronic consequences of a CVA	183	11.06	24	16.55	< 0.001 [b]
Diabetes	295	17.82	42	28.97	< 0.001 [b]
Osteoporosis	204	12.33	38	26.21	< 0.001 [b]
Degenerative disease of peripheral joints	639	38.61	95	65.52	< 0.001 [b]
Degenerative diseases of the spine	697	42.11	102	70.34	< 0.001 [b]
Lumbar spine pain syndromes	647	39.09	90	62.07	< 0.001 [b]
Thoracis spine pain syndromes	374	22.60	58	40.00	< 0.001 [b]
Cervical spine pain syndromes	455	27.49	76	52.41	< 0.001 [b]
Rheumatism	448	27.07	75	51.72	< 0.001 [b]
Allergy	228	13.78	44	30.34	< 0.001 [b]
Neoplastic disease	102	6.16	18	12.41	0.002 [b]
Asthma	100	6.04	18	12.41	0.002 [b]
Chronic respiratory diseases	97	5.86	22	15.17	< 0.001 [b]
Gastric and duodenal ulcerative disease	101	6.10	27	18.62	< 0.001 [b]
Urinary incontinence	169	10.21	51	35.17	< 0.001 [b]
Migraine	182	11.00	52	35.86	< 0.001 [b]

[*] PLN - (Polish zloty) - the official name of the Polish currency.
[a] Chi-square independence test. [b] Significance test for two factions.

Lower depression prevalence was found in the United States (4.8%).[16] Our study indicated that risk factors for depression in the elderly are sex, and marital status. Women are more likely to develop depression than men – this is in line with results of Anderson et al.[17] Depression was more often diagnosed in single respondents – the PolSenior study results were similar.[14]

Our results show that risk of depression in the elderly rises together with increased disability. The domains particularly correlated with depression are: social participation restrictions, cognitive disorders, mobility limitations and life activities. Lack of social facilitation accompanied by loneliness lowers self esteem and negatively impacts health of older people.[18] Several studies had confirmed the relationship between cognitive disorders and the higher risk of developing depression.[19,20] Cognitive disorders developed in the course of depression often complicate its treatment, resulting in lasting difficulties in physical and psychological functioning.[21] According to Bhattacharya et al., depression, regardless of demographic factors, leads to chronic functional disability.[22]

Table 2
Depression and socio-demographic factors.

	Adjusted risk ratio	95% CI	*p*
Number of chronic diseases	1.742	1.348–2.251	< 0.001
Sex			
Female	1.578[a]	1.059–2.351	0.025
Disability			
Mild	1.921[b]	0.869–4.246	0.107
Moderate	4.070[b]	1.876–8.830	< 0.001
Severe or complete	6.768[b]	2.993–15.302	< 0.001
Marital status			
Widower/widow	0.847[c]	0.558–1.288	0.438
Bachelor/spinster	0.759[c]	0.759–3.487	0.211
Divorced/separated	3.904[c]	1.703–8.953	0.001

[a] In relation to men. [b] In relation to subjects without disability. [c] In relation to subjects who are married or living with a partner.

Our study revealed a significant relationship between depression and chronic diseases. Voinov et al. revealed the bidirectional relationship between depression and chronic disease. On the one hand, depression has a negative impact on development of chronic diseases, while on the other hand, chronic diseases result in prognosis for developing depression.[23] According to our study, diseases such as migraine, urinary incontinence, ulcer diseases, degenerative disorder and heart diseases increase the risk of depression several times. Luter et al. presented a strong relationship between migraine and depression.[24] According to Lipton et al., symptoms of depression and anxiety are related to disability caused by migraine.[25] Bidirectional relationships between depression and chronic diseases were also found in patients with urinary incontinence, hypertension, cardiovascular diseases and arthritis.[26–28] Depression is increasingly believed to induce chronic inflammation related to immune system. Chronic inflammation uses pathogenesis of inter alia heart diseases, neurological or degenerative disorders.[29,30] This model presents mental disorders and chronic diseases as clinical symptoms of the same pathophysiologic process.[23]

5. Conclusions

To summarise, it is necessary to mention that our study presents that the incidence of depression is higher in the case of women, single people and those with lower income, as well as it occurs together with an increased disability level (particularly in the domains of social participation, cognitive functioning, mobility and life activities) and the number of chronic diseases. With reference to the chronic diseases that are most closely correlated with depression are urinary incontinence and migraine. Therefore, on the basis of the points mentioned above, it is apparent that the diagnosis and treatment of depression should be one of the fundaments of standard and complex rehabilitation programmes in chronic diseases among the elderly. They would allow us to prevent disability levels and improve functional abilities of the elderly.

Table 3
Depression and individual disability domains.

Domain	Disability	Prevalence (%)	Adjusted risk ratio	95% CI	*p*
Domain 1	None	3.91			
	Mild	7.24	1.920	1.140–3.232	0.014
	Moderate	11.57	3.218	2.003–5.170	< 0.001
	Severe or extreme	17.68	5.279	3.136–8.887	< 0.001
Domain 2	None	3.09			
	Mild	6.77	2.280	1.254–4.146	0.007
	Moderate	9.84	3.426	1.920–6.113	< 0.001
	Severe or extreme	15.08	5.572	3.235–9.597	< 0.001
Domain 3	None	5.68			
	Mild	10.88	2.028	1.305–3.152	0.002
	Moderate	14.53	2.821	1.742–4.571	< 0.001
	Severe or extreme	14.62	2.842	1.648–4.900	< 0.001
Domain 4	None	3.55			
	Mild	9.33	2.791	1.657–4.700	< 0.001
	Moderate	10.26	3.101	1.782–5.396	< 0.001
	Severe or extreme	12.37	3.829	2.285–6.416	< 0.001
Domain 5.1	None	3.17			
	Mild	7.05	2.322	1.211–4.450	0.011
	Moderate	8.02	2.668	1.503–4.737	0.001
	Severe or extreme	15.15	5.460	3.351–8.897	< 0.001
Domain 6	None	1.36			
	Mild	4.09	3.090	1.154–8.273	0.025
	Moderate	10.71	8.682	3.456–21.809	< 0.001
	Severe or extreme	16.72	14.531	5.749–36.729	< 0.001

Table 4
Depression prevalence and particular diseases.

		Prevalence (%)	Adjusted risk ratio	95% CI	*p*
Coronary diseases (ischaemic heart disease) or angina pectorism	Yes	14.24	3.027	2.145–4.271	< 0.001
	No	5.20			
Hypertension	Yes	10.42	2.320	1.572–3.424	< 0.001
	No	4.77			
CVA (stroke, embolism) and chronic consequences of a CVA	Yes	16.96	2.533	1.497–4.285	< 0.001
	No	7.46			
Diabetes	Yes	12.46	1.880	1.285–2.750	0.001
	No	7.04			
Osteoporosis	Yes	15.70	2.526	1.696–3.761	< 0.001
	No	6.87			
Degenerative disease of peripheral joints	Yes	12.94	3.021	2.115–4.315	< 0.001
	No	4.69			
Degenerative diseases of the spine	Yes	12.77	3.260	2.253–4.718	< 0.001
	No	4.30			
Lumbar spine pain syndromes	Yes	12.21	2.549	1.797–3.617	< 0.001
	No	5.17			
Thoracis spine pain syndromes	Yes	13.43	2.283	1.606–3.246	< 0.001
	No	6.36			
Cervical spine pain syndromes	Yes	14.31	2.905	2.061–4.095	< 0.001
	No	5.44			
Rheumatism	Yes	14.34	2.887	2.048–4.069	< 0.001
	No	5.48			
Allergy	Yes	16.18	2.727	1.863–3.990	< 0.001
	No	6.61			
Neoplastic disease	Yes	15.00	2.158	1.267–3.676	0.005
	No	7.56			
Asthma	Yes	15.25	2.204	1.293–3.757	0.004
	No	7.55			
Chronic respiratory diseases	Yes	18.49	2.873	1.746–4.727	< 0.001
	No	7.32			
Gastric and duodenal ulcerative disease	Yes	21.09	3.521	2.213–5.599	< 0.001
	No	7.06			
Urinary incontinence	Yes	23.18	4.771	3.275–6.949	< 0.001
	No	5.95			
Migraine	Yes	22.22	4.525	3.117–6.569	< 0.001
	No	5.94			

Financial support

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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