

PREVALENCE, COSTS AND SERVICES OF COMORBID CONDITIONS ASSOCIATED WITH FUNCTIONAL DYSPEPSIA

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ABSTRACT:

OBJECTIVES: The etiology of functional dyspepsia (FD) is debated. However, no published data exist on the associated co-morbid conditions with FD. This study aimed to assess the prevalence, services, and costs related to co-morbid conditions associated with FD. **METHODS:** Retrospective database analysis on a 4-year study period, from January 1, 2001, through December 31, 2004 using payroll data and adjudicated health insurance medical and prescription claims on more than 300,000 employees. Study comparisons were performed among employees with FD and propensity-score-matched employees without FD (controls). Outcome measures included the prevalence, costs and utilization of health services for various comorbid conditions as defined by the Agency for Healthcare Research and Quality (AHRQ). **RESULTS:** Employees in cohort FD (N=1669) and a 50:1 matched control-cohort (N=83,450) were compared. Employee with FD were more likely to have all major diagnostic categories (MDC) including digestive system, blood and blood forming organs, mental disorders, infections and parasitic disease, etc. except pregnancy and prenatal related disease, compared to matched controls. The top MDC prevalence ratios between the two groups were for digestive systems (6.3:1), blood and blood form organs (2.6:1), mental disorders (2.1:1), and infectious & parasitic disease (2.0:1). More interestingly, eighteen of the top 30 most prevalent AHRQ "specific" categories were non-specific with the terms like "other" or "undefined" in the title. Moreover, annual medical costs for the FD cohort were greater than for controls in 155 (59%) of the 261 AHRQ's Specific Categories and significantly greater ($P \leq 0.05$) in 76 categories (29%). Similarly, the services were greater for 179 (69%) of the 261 Specific Categories and significantly greater ($P \leq 0.05$) in 110 categories (42%). **CONCLUSIONS:** This study showed excess comorbidity in employees with FD compared to employees without FD, might be a major determinant factors for excess health-care services and health-care costs of functional dyspepsia.

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INTRODUCTION:

- Functional dyspepsia (FD) is a common, morbid condition with dyspeptic symptoms not obviously explained by an organic disease and was previously called non-ulcer or idiopathic dyspepsia.^{1,2}
- The etiology of functional dyspepsia (FD) is debated.
- Data are limited on the co-morbid conditions associated with FD.

OBJECTIVE:

This study aimed to assess the prevalence, number of services, and costs related to co-morbid conditions associated with FD using standardized categories.

METHODS:

- An analysis was performed on retrospective data (2001 to 2004) from the Human Capital Management Services (HCMS) Research Reference Database. The database:
 - Consists of employee records representing the retail, service, health, manufacturing, and financial industries.
 - Includes medical and prescription claims.
 - Contains hours missed from work for employees, payments made to employees (from payroll records and disability claims) for paid absences, and employee-specific objective at-work productivity output data for a subset of the employee population.
 - Is HIPAA Compliant.
- ICD-9 codes were used to identify employees with a primary, secondary, or tertiary diagnosis of FD (536.8x). Non-FD employees were defined as the control group.
- The index date:
 - For each employee with FD, was three months before the first date of service associated with the disease.
 - For controls, was the average index date of subjects with FD.
- Using propensity-scores, 50 controls were matched to every employee with FD.
- All cost data were inflated to constant August 2009 U.S. dollars.³
- All medical claims costs and services were assigned based on the primary ICD-9 codes to two different Agency for Health Research and Quality (AHRQ) categorizations⁴:
 - 17 Major Diagnostic Categories (MDC) and
 - 261 Specific Categories (SCs).
- Prevalence rates were based on persons within the cohort with primary, secondary, or tertiary ICD-9 codes for each category.
- Mean costs were calculated over the entire cohort.
- Service utilization, or "number of reasons for visit or procedures during a visit" per employee, was calculated over the entire cohort. A medical office visit could encompass several services.
- Differences were considered statistically significant when $P \leq 0.05$.
- All models and statistics were generated via version 9.1 of the SAS System for Windows.

RESULTS:

- Employees in FD cohort (N=1669) and a 50:1 matched control cohort (N=83,450) were compared and found to have similar descriptive characteristics (**Table 1**).
- Employees with FD were more likely to have all major diagnostic categories (MDC, **Table 2**) including digestive system, blood and blood forming organs, mental disorders, infections and parasitic disease, etc. except pregnancy and prenatal related disease, compared to matched controls.
- The top MDC prevalence ratios between the two groups were for:
 - digestive systems (6.3:1),
 - blood and blood form organs (2.6:1),
 - mental disorders (2.1:1), and
 - infectious & parasitic disease (2.0:1).
- Focusing on the Specific categories:
 - Eighteen of the top 30 most prevalent AHRQ "specific" categories were non-specific with terms like "other" or "undefined" in the title (**Table 3**).
 - The Annual Costs of Gastrointestinal Disease Specific Categories within the top 30 most prevalent categories are shown in **Figure 1**.
 - Moreover, annual medical costs were greater for the FD cohort than for controls in 155 (59%) of the 261 AHRQ's Specific Categories and significantly greater ($P < 0.05$) in 76 categories (29%).
 - Similarly, the number of services was greater in the FD cohort than for controls in 179 (69%) of the 261 Specific Categories and significantly greater ($P < 0.05$) in 110 categories (42%).

CONCLUSIONS:

- This study showed excess comorbidity in employees with FD compared to employees without FD.
- FD might be a major determinant for excess health-care services and health-care costs in employees.
- Future research needs to address the relationships between the different comorbidities and FD.

Table 1. Demographics (no significant differences)

Variable	Employees with Functional Dyspepsia		Matched Employees without Functional Dyspepsia	
	N	Mean (S.E.) or percent	N	Mean (S.E.) or percent
Age (at index date)	1,669	41.91 (0.24)	83,443	41.71 (0.03)
Tenure (at index date)	1,669	9.42 (0.20)	83,450	9.44 (0.03)
Female	1,669	54.1%	83,450	53.7%
Married	1,518	57.4%	75,904	57.4%
White	1,302	61.5%	64,819	61.9%
Black	1,302	17.1%	64,819	17.2%
Hispanic	1,302	17.0%	64,819	16.4%
Exempt	1,669	27.6%	83,450	27.9%
Full Time	1,669	93.5%	83,450	93.6%
Annual Salary	1,659	\$48,969 (\$764)	82,479	\$48,917 (\$302)

Table 2. Prevalence, Costs, and Services by the 17 AHRQ Major Diagnostic Categories by decreasing prevalence ratio

MDC Category	Prevalence†			Annual Cost		Annual Services	
	FD	Controls	Ratio	FD	Controls	FD	Controls
Digestive System	100.00%	15.92%	6.3:1	\$2,132	\$245*	8.54	0.89*
Blood and Blood Forming Organs	8.75%	3.39%	2.6:1	\$76	\$18*	0.68	0.23*
Mental Disorders	19.41%	9.27%	2.1:1	\$139	\$67*	1.82	0.76*
Infections and Parasitic Diseases	23.55%	11.95%	2.0:1	\$59	\$31	0.95	0.43*
Congenital Anomalies	2.28%	1.21%	1.9:1	\$15	\$12	0.06	0.04
Neoplasms	22.59%	12.79%	1.8:1	\$1,077	\$285*	3.14	1.09*
Circulatory System	39.19%	22.37%	1.8:1	\$1,108	\$350*	5.12	1.90*
Respiratory System	55.00%	33.04%	1.7:1	\$337	\$164*	3.18	1.63*
Endocrine Nutritional Metabolic Immun	36.61%	22.04%	1.7:1	\$218	\$123*	3.16	1.77*
Other Conditions	82.45%	51.60%	1.6:1	\$804	\$201*	8.09	2.93*
Skin and Subcutaneous Tissue	27.62%	17.72%	1.6:1	\$116	\$74*	1.07	0.65*
Musculoskeletal Connective Tissues	45.24%	29.37%	1.5:1	\$661	\$405*	6.64	4.04*
Nervous Systems Sense Organs	40.80%	27.25%	1.5:1	\$270	\$178*	2.26	1.25*
Injury and Poisoning	25.94%	17.44%	1.5:1	\$609	\$221*	3.28	1.60*
Genitourinary System	50.03%	35.94%	1.4:1	\$443	\$251*	3.41	2.13*
Pregnancy Childbirth Puerp	5.33%	5.41%	1.0:1	\$103	\$176	0.57	0.70
Perinatal Period	0.60%	0.74%	0.8:1	\$3	\$5	0.01	0.04

† All prevalences significantly different between cohorts ($P < 0.05$) except Pregnancy Childbirth Puerp and Perinatal Period; *Significantly different (FD vs. Controls), $P < 0.05$

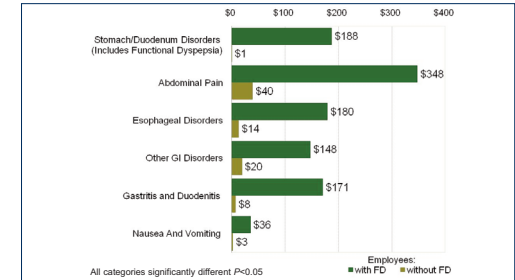
FD Cohort N=1669; Controls N=83,450

Table 3. Prevalence, Costs, and Services for the 30 Most Prevalent Coexisting Conditions by AHRQ Specific Category (30 most-prevalent categories in the FD cohort)

AHRQ Specific Category	Prevalence rank within FD cohort	Prevalence†			Annual Cost		Annual Services	
		FD	Controls	Ratio	FD	Controls	FD	Controls
Gastrointestinal disease								
Stomach/Duodenum Disorders ²	1	100.0%	0.2%	507.6:1	\$188	\$11*	2.49	0.01*
Abdominal Pain	2	26.5%	8.2%	6.7:1	\$348	\$40*	3.46	0.21*
Esophageal Disorders	3	32.6%	3.9%	8.4:1	\$180	\$14*	1.17	0.11*
Other GI Disorders	6	28.1%	4.7%	6.0:1	\$148	\$20*	0.99	0.15*
Gastritis and Duodenitis	9	23.9%	1.7%	14.0:1	\$171	\$8*	0.87	0.05*
Nausea And Vomiting	26	10.1%	1.0%	6.9:1	\$36	\$3*	0.42	0.04*
Nonspecific disease								
Screening Suspected Condition	7	27.5%	20.4%	1.4:1	\$37	\$20*	0.62	0.45*
Medical Examination/Evaluation	8	24.2%	15.9%	1.5:1	\$30	\$16*	1.09	0.72*
Residual Codes II defined Symptoms	13	21.0%	11.6%	1.8:1	\$28	\$17*	0.63	0.33*
Non-specific Chest Pain	14	20.0%	6.9%	2.9:1	\$192	\$53*	1.67	0.42*
Unknown Diagnosis	15	19.8%	11.3%	1.8:1	\$4	\$2	0.11	0.15
Respiratory disease								
Other Upper Respiratory Infections	4	31.9%	19.0%	1.6:1	\$38	\$26	0.85	0.5*
Other Lower Respiratory Disease	16	18.0%	7.3%	2.5:1	\$51	\$20*	0.59	0.24*
Other Upper Respiratory Disease	17	18.0%	9.4%	1.9:1	\$67	\$27*	0.79	0.45*
Acute Bronchitis	30	8.8%	5.3%	1.6:1	\$12	\$4*	0.19	0.11*
Cardiovascular disease								
Hyperlipidemia	12	21.2%	12.1%	1.7:1	\$20	\$12*	1.08	0.61*
Essential Hypertension	18	17.8%	12.4%	1.4:1	\$24	\$19	0.84	0.61*
Musculoskeletal disease								
Other Connective Tissue Disease	10	22.1%	13.0%	1.7:1	\$100	\$51*	1.12	0.81*
Intervertebral Disc Disorders	11	22.1%	12.7%	1.7:1	\$236	\$133*	3.22	1.83*
Other Non-Traumatic Joint Disorders	20	16.5%	9.8%	1.6:1	\$43	\$30*	0.81	0.49*
Sprains And Strains	23	11.9%	8.1%	1.5:1	\$63	\$31*	1.46	0.67*
Other Skin Disorders	19	16.8%	10.1%	1.7:1	\$26	\$15*	0.42	0.27*
Other Benign Neoplasms	21	13.3%	6.0%	2.2:1	\$112	\$39*	0.57	0.19*
Malaise And Fatigue	22	12.7%	5.6%	2.3:1	\$14	\$0*	0.47	0.23*
Neurologic & Psychiatric disease								
Other Nervous Systems Disorders	24	10.9%	6.3%	1.7:1	\$82	\$46*	0.79	0.35*
Headache Including Migraine	25	10.6%	5.6%	1.9:1	\$39	\$22*	0.46	0.23*
Dissociative/Personality Disorders	29	9.5%	3.5%	2.7:1	\$26	\$7*	0.61	0.15*
Genitourinary disease								
Other Female Genital Disease	5	31.0%	24.6%	1.3:1	\$68	\$46*	1.05	0.83*
Urinary Tract Infections	27	9.9%	5.3%	1.9:1	\$15	\$9*	0.37	0.2*
Genitourinary Symptoms/II Defined	28	9.6%	4.1%	2.3:1	\$16	\$9*	0.37	0.15*

† All prevalences shown are significantly different (FD vs. Controls, $P < 0.05$); *Significantly different (FD vs. Controls, $P < 0.05$); FD Cohort N=1669; Controls N=83,450; †Includes FD Abbreviations: Prevalence = % of cohort with claims for Category, Ratio: FD / Controls.

Figure 1. Annual Costs of Gastrointestinal Disease Specific Categories within the 30 Most Prevalent Categories



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