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Occupation type, family demands and mental health: analysis of linked administrative data

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ABSTRACT

Background: While employment generally promotes positive health and wellbeing, some jobs may be less salutogenic than others. Few studies have examined mental health across a range of broadly defined occupation types using a large population sample.

Aims: To examine the prevalence of mental health problems across a wide range of occupation types, and further examine the association of family demands, controlling for key social determinants and health-related factors.

Methods: We used linked administrative data from 2011 NI Census returns; NI Properties data; and Enhanced Prescribing Data (EPD) 2011/12. We examined self-reported mental health problems and receipt of psychotropic medication among 553,925 workers aged 25 and 59 years.

Results: Self-reported chronic mental ill health was more prevalent among workers in lower paid occupations, while “public-facing” occupations had the highest rates of medication. In fully adjusted models, informal caregivers were less likely to report mental health problems but more likely to be in receipt of psychotropic medication, as were lone parents. The association of family demands also varied across occupational groupings.

Conclusion: Future development of mental health at work plans should take cognisance of occupation specific mental health risk and wider family circumstances to support workers’ mental wellbeing most effectively.

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Introduction


As an important aspect of personal identity and social status, employment, generally, promotes positive health and wellbeing (Modini et al., 2016), providing structure, social interaction, and purpose. However, some jobs and related activities may be less salutogenic than others. For example, the influential “Whitehall Studies” of work, stress and health among British civil servants observed a clear “social gradient” for a wide range of physical and mental health conditions (Bell et al., 2004). Also, a longitudinal study (O’Reilly and Rosato, 2013) noted an increased risk in all-cause mortality among men who worked in “routine occupations” for more than 55 hours per week.

Few large representative studies have examined mental health across a wide range of occupation types and results from available studies vary substantially (Inoue et al., 2010; Llana-Nozal et al., 2004; Marchand, 2007; Marchand et al., 2003; Riise et al., 2003; Sanne et al., 2003; Stansfeld et al., 2011). Using data from the second British Psychiatric Morbidity Survey, Stansfeld et al. (2011) examined the prevalence and risk of common mental disorders (CMDs) among working age individuals: occupations with high

CMD prevalence included teachers, welfare and youth workers, and care assistants, while general managers in government and large organisations were among the professions with elevated risk of CMD, after controlling for other characteristics. In a large representative study of 77,377 Canadian workers, Marchand (2007) found high prevalence of mental ill health among machine operators, labourers and cleaners. In a cross-sectional study of 23,312 workers in Hordaland County in Norway, Riise et al. (2003) found that agricultural and fishery workers had the poorest mental health scores, while Sanne et al. (2003) found a distinct inverse relationship between skill levels and depression and anxiety scores in a separate analysis of data from the same study. In contrast, both Marchand et al. (2003) and Inoue et al. (2010) found little evidence of large variation in mental health across occupations.

Aside from job related characteristics, it is likely that family/home-related demands will have, not only a direct impact on mental health outcomes, but will also interact with working demands in influencing mental health. In Canada, Cadieux and Marchand (2014) found distress was associated with marital status, marital stress and parental

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stress, after controlling for occupation type, working conditions and time. The Whitehall II studies (Bell et al., 2004) found both “family-to-work” and “work-to-family” conflicts had deleterious effects on mental and physical health and again alluded to important gender differences, which may reflect traditional male/female work and family roles and variation in working patterns. Differential findings for males and females with respect to the association of occupation and mental health from other studies also support a gender-based approach to analysis in this area. In an examination of data from the UK National Child Development Survey, Llena-Nozal et al. (2004) found large occupation effects for females but not for males, while *employment status* was an important predictor of poorer mental health in males but not in females. Echoing the Whitehall II studies, Lennon and Rosenfield (1992) argue that work and family conditions interact in their association with mental health and propose a combined developed a “job” and “family” model in their study of mental ill health.

Despite an extensive wider literature on occupations and mental health, in-depth studies in this area require a large sample of workers across a wide range of occupations with a common measure of mental health (Stansfeld et al., 2011). As far as can be detected, the current study represents the first population-based administrative data study from within the UK to examine variation in mental disorder across a wide range of standard occupation types. Linkage of large clinically relevant datasets has allowed an in-depth examination of mental health and occupations, facilitating analysis of mental health, jobs and family responsibilities that accounts for a wide range of sociodemographic and socio-economic contextual factors.

Aim

To examine the prevalence of mental health problems across standard occupational classifications (SOCs) among the Northern Ireland (NI) working population. In addition, we further examine the association of family demands with mental ill health across occupation types, controlling for key social determinants and health-related factors. Previous evidence points to gender differences in “family-to-work” and “work-to family” conflict, and preliminary analysis points to significant gender differences in mental health across most occupation types. Thus, we additionally aimed to explore the interaction of sex and family responsibilities with mental health across broad occupational groupings.

Methods

Data

We used linked NI administrative data, facilitated within the Administrative Data Research Centre NI (ADRC-NI), under the auspices of Administrative Data Research UK. The following datasets were merged: 2011 individual and household NI Census returns; NI Properties data; and Enhanced Prescribing Data (EPD) 2011/12. Consent was not required

for this study as data were provided in anonymised format meaning the rights of individuals are respected with adequate privacy protection. These data are classed as confidential and subject to strict controls: it is held in a safe setting by the NI Statistics and Research Agency (NISRA); is available only to accredited research team members, who access de-identified data after signing Data Access Agreements. These contracts and organisational controls ensure no individual can be re-identified during the analysis or in any of the outputs. All outputs are scrutinised by data custodians, ensuring that privacy and disclosure safeguards are robust. Use of the NI Census data for this research was approved by the East Midlands – Leicester South Research Ethics Committee (REC reference: 18/EM/0053).

Measures

Outcome measures

We derived two indicators of the presence of a mental health problem: (1) self-reported chronic mental health problem, based on individuals who responded YES to a question in the 2011 NI Census which asked if an individual had an *emotional or mental health condition that lasted, or was expected to last, at least 12 months* and (2) receipt of psychotropic medication, which identified individuals prescribed medication in the following Chapter 4 British National Formulary (BNF) categories *at any point in the 12-month period* from April 2011 to March 2012: Hypnotics and anxiolytics; drugs used in psychosis and related disorders and anti-depressants. It should be noted that these two measures are not comparable: the Census question requires persistence over 12 months and therefore may be viewed as a measure of more chronic mental health disorder; while the second indicator, based on receipt of psychotropic medication *at any point within a 12-month period*, will include individuals with short-term emotional or mental health problems as well as those with more persistent problems. We therefore anticipate higher prevalence rates based on the latter measure.

Explanatory factors

We examined the likelihood of a mental health problem across occupation groups as defined by the Standard Occupational Classification 2000 coding schedule (SOC2000), a hierarchically organised system with nine *major* and 25 *sub-major* groupings. Contextual indicators from the Census included: sex (male/female); number of hours worked (less than 15, 16–30, 31–48 and 49 hours or more); and three indications of *family-related demands*: dependent children (no/yes), informal caregiving (no/yes) and lone parent status (no/yes). Models were controlled for individual characteristics known to be associated with mental disorder, including other self-reported health conditions; age group (five-year bands); marital status (grouped as married, never married and a single group of separated/divorced/widowed); and locale of residence (urban, intermediate, and rural). Three variables representing socio-economic

circumstance (SEC) were included: (i) household car availability (grouped as two or more cars, one car, no car access); (ii) educational attainment (university level, intermediate level, no qualifications recorded) and (iii) a combination of housing tenure and rateable value of the property. Rateable value had been derived as part of an exercise by central government in 2010 to determine the level of local residential taxes and combined with tenure to produce a meaningful sixfold gradation: private and social renting; and, for owner-occupiers, five categories ranging from less than £75,000 to over £200,000.

Analysis

Analysis was restricted to persons aged between 25 and 59 years, living in private households and normally resident in NI, who were in paid employment at the 2011 Census ($N=553,925$; males = 277,148 and females = 276,777). Descriptive statistics report the prevalence of both self-reported mental disorder (that has lasted or was expected to last for 12 months) and prescription of psychotropic medication at any point over a 12-month period across major and sub-major SOC. Given consistently reported higher levels of mental disorder among females in the general population, descriptive analysis was stratified by sex. Logistic regression models for the overall sample of working adults report odds ratios (ORs) of both self-reported CMD and psychotropic medication associated with *major standard occupational classification*, working hours and family demands. In further logistic regression models, stratified by major SOC, a sex

interaction term was introduced to examine the differential association of family responsibilities for males and females across broad occupation types. The models were informed by likelihood ratio tests, which compared (1) the main association of sex and each of the indicators of family responsibilities with the two indicators of mental ill health with (2) an interaction term for sex and each family demands indicator. These comparisons were stratified by each of the nine major SOCs and interaction terms included in fully adjusted models where there was evidence of effect modification. Fully adjusted models controlled for any other self-reported health condition and individual socio-demographic and socio-economic characteristics. All analyses were completed using Stata version 15.0 (StataCorp, 2015). The results of our study are reported according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement guidelines (Vandenbroucke et al., 2007).

Results

Prevalence of mental health problems

Table 1 shows male and female prevalence of a mental health problem based on both self-report and psychotropic medication for across nine major and 20 sub-major SOCs. Overall, 3.10% of workers reported a chronic mental health condition lasting 12 months, while 17.95% had any mental health prescription over a 12-month period. Prevalence rates among all workers are consistent with gender differences, with females more likely to have a mental health condition based on both outcomes. Analysis relating to any self-reported mental health

Table 1. Prevalence of common mental disorder across major and sub-major SOCs for all working adults, males and females aged 25–59.

SOC – major and sub-major categories	Self-reported mental disorder			Any 12-month psychotropic medication prescription		
	Overall % (n)	Males % (n)	Females % (n)	Overall % (n)	Males % (n)	Females % (n)
1. Managers, directors and senior officials	2.44 (1187) ^a	2.27 (684)	2.70 (503)	14.82 (77,214) ^a	10.99 (3304)	21.02 (3910)
Corporate managers and directors	2.13 (671) ^a	1.92 (384)	2.51 (287)	14.05 (4416) ^a	10.50 (2097)	20.24 (2319)
Other managers and proprietors	2.99 (516)	2.97 (300)	3.02 (216)	16.23 (2798) ^a	11.95 (1207)	22.28 (1591)
2. Professional occupations	1.96 (2086) ^a	1.70 (730)	2.14 (1356)	14.93 (15,859) ^a	10.16 (4352)	18.15 (11,567)
Science, research, engineering and tech profs	1.66 (317)	1.60 (240)	1.88 (77)	10.15 (1939) ^a	8.87 (1332)	14.62 (607)
Health professionals	2.12 (671) ^a	1.25 (72)	2.32 (599)	17.95 (5677) ^a	10.69 (616)	19.59 (5061)
Teaching and educational professionals	1.85 (536)	1.74 (141)	1.89 (395)	15.58 (4522) ^a	11.04 (897)	17.34 (3625)
Business, media and public service professionals	2.12 (562)	1.99 (277)	2.27 (285)	14.06 (3721) ^a	10.81 (1507)	17.67 (2214)
3. Associate professional and technical occupations	2.84 (1443) ^a	2.66 (758)	3.07 (685)	16.04 (8152) ^a	11.81 (3367)	21.44 (4785)
4. Administrative and secretarial occupations	3.65 (3149)	3.67 (838)	3.65 (2311)	21.71 (18,709) ^a	13.84 (3163)	24.56 (15,546)
Administrative occupations	3.66 (2573)	3.64 (867)	3.67 (1766)	21.03 (14,781) ^a	13.85 (3072)	24.35 (11,709)
Secretarial and related occupations	3.62 (576)	4.60 (31)	3.58 (545)	24.72 (3928) ^a	13.50 (91)	25.22 (3837)
5. Skilled trades occupations	3.14 (2320) ^a	3.06 (2026)	3.76 (294)	12.38 (9155) ^a	10.86 (7134)	25.20 (1971)
Skilled agricultural and related trades	3.76 (437)	3.72 (397)	4.18 (40)	1.77 (1370) ^a	11.09 (1184)	19.46 (186)
Skilled metal, electrical and electronic trades	2.74 (659)	2.74 (648)	2.66 (11)	10.34 (2485) ^a	10.10 (2384)	24.40 (101)
Skilled construction and building trades	3.12 (746)	3.14 (734)	2.19 (12)	11.42 (2730) ^a	11.06 (2585)	26.46 (145)
Textiles, printing and other skilled trades	3.33 (478) ^a	2.92 (247)	3.91 (231)	17.88 (2570) ^a	12.18 (1031)	26.08 (1539)
6. Caring, leisure and other service occupations	3.45 (1726) ^a	4.16 (280)	3.34 (1482)	26.33 (13,457) ^a	18.19 (1223)	27.56 (12,234)
Caring personal service occupations	3.38 (1354)	3.72 (153)	3.34 (1201)	27.16 (10,883) ^a	18.72 (776)	28.13 (10,112)
Leisure, travel and related personal service occupations	3.69 (408) ^a	4.87 (127)	3.33 (281)	23.30 (2574) ^a	17.34 (452)	25.14 (2122)
7. Sales and customer service occupations	3.91 (1519)	3.70 (434)	4.00 (1085)	24.00 (9326) ^a	14.23 (1671)	28.23 (7655)
Sales occupations	3.86 (1275)	3.68 (348)	3.94 (927)	24.17 (7977) ^a	14.08 (1333)	28.22 (6644)
Customer service occupations	4.17 (244)	3.78 (86)	4.43 (158)	23.08 (1349) ^a	14.84 (338)	28.34 (1011)
8. Process, plant and machine operatives	3.59 (1646) ^a	3.51 (1418)	4.17 (228)	14.30 (6554) ^a	12.86 (5191)	24.95 (1363)
Process, plant and machine operatives	3.34 (720) ^a	3.11 (531)	4.21 (189)	14.64 (3154) ^a	12.20 (2082)	23.90 (1072)
Transport and mobile machine drivers/operatives	3.81 (926)	3.81 (887)	3.99 (39)	14.00 (3400) ^a	13.34 (3109)	29.79 (291)
9. Elementary occupations	3.93 (2052)	3.88 (1081)	3.98 (971)	21.04 (10,999) ^a	14.38 (4012)	28.66 (6989)
Elementary trades and related occupations	3.93 (364)	3.80 (283)	4.47 (81)	14.24 (1320) ^a	12.53 (934)	21.30 (386)
Elementary administration and service occupations	3.93 (1688)	3.90 (798)	3.94 (890)	22.51 (9679) ^a	15.06 (3078)	29.25 (6601)
Overall prevalence	3.10 (17,164) ^a	2.98 (8249)	3.22 (8915)	17.95 (99,425) ^a	12.08 (33,467)	23.83 (99,425)

^aEvidence consistent with gender differences at the 5% level of significance.

condition across the major SOCs shows the highest prevalence rates (all approximately 4%) among *elementary occupations*, *sales and customer service*, and *process, plant, and machine operatives*. Within sub-major categories highest rates (also approximately 4%) were among *customer service occupations*, *elementary and related trades/elementary administrative and service*, and *sales* occupations. Results based on psychotropic medication show a different pattern. Of the major SOCs *caring, leisure and other service* (26.33%), *sales and customer service* (24.00%) and *administrative and secretarial* (21.71%) occupations recorded the highest prevalence rates. Of the sub-major categories, *caring and personal service* (27.16%), *secretarial and related* (24.72%) and *sales* (24.17%) occupations recorded the highest rates.

Risk of mental ill health associated with occupation type and family demands

Self-reported mental health

Univariable analysis of self-reported mental health disorder (Table 2), shows that compared to “managers, directors and senior officials”, likelihoods were higher among all other major SOCs, except for “professional occupations”, which recorded lower likelihood (OR = 0.80, 95% CI 0.75–0.86). In fully adjusted models, higher likelihoods remained among “associate professional and technical”, “administrative”, “skilled trades” and “sales and customer service”, and “process, plant and machine operative” occupations. Females were more likely than men to have a self-reported disorder, an effect attenuated in the fully adjusted model (OR = 1.05, 1.01–1.10). We noted a trend of reduced likelihood of self-

reported disorder as working hours increase. Informal caregiving appears to have minor influence in the fully adjusted model (OR = 0.96, 0.92–0.99) and the higher risk among lone parents in univariable analysis diminishes in fully adjusted analysis. Workers with dependent children had reduced risk of self-reported CMD (OR = 0.86, 0.85–0.89).

Psychotropic medication

For psychotropic medication (Table 2), in both univariable and fully adjusted models, there were higher likelihoods among “associate professional and technical”, “administrative and secretarial”; “caring, leisure and other service”; and “sales and customer service occupations”. In contrast, “skilled trades” and “process, plant and machine operatives” had lower likelihood of prescriptions (OR = 0.89, 0.85–0.92 and OR = 0.92, 0.88–0.95 in fully adjusted models). Female workers were more likely to have received a prescription, while working longer hours and presence of dependent children were again protective. Informal caregiving and lone-parenthood were associated with *higher risk* of psychotropic medication prescriptions (OR = 1.15, 1.13–1.17 and OR = 1.19, 1.15–1.22, respectively).

Full results from the fully adjusted models presented in Table 2, showing associations with all explanatory variables, are available in [supplementary material](#).

Association of family demands stratified by occupation type

Table 3 (self-report) and Table 4 (psychotropic medication) present results stratified by the major occupational

Table 2. Logistic regression models showing the association of major SOC, working hours and household demands with self-reported mental disorder and any 12-month psychotropic medication use.

Major SOC	Self-reported mental disorders for persons in employment				Any 12-month psychotropic medication prescriptions for persons in employment			
	Univariable associations		Fully adjusted model ^a		Univariable associations		Fully adjusted model ^a	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Managers, directors and senior officials	1.00		1.00		1.00		1.00	
Professional occupations	0.80***	0.75–0.86	0.93	0.86–1.01	1.01	0.98–1.04	1.00	0.97–1.03
Associate professional/technical	1.17***	1.08–1.26	1.16***	1.07–1.26	1.10***	1.06–1.14	1.05**	1.01–1.09
Admin and secretarial	1.52***	1.42–1.62	1.25***	1.16–1.35	1.59***	1.55–1.62	1.11***	1.08–1.15
Skilled trades	1.30***	1.21–1.39	1.09*	1.01–1.18	0.81***	0.79–0.84	0.89***	0.85–0.92
Caring, leisure and other service	1.43***	1.33–1.54	1.01	0.93–1.10	2.05***	1.99–2.12	1.18***	1.14–1.22
Sales and customer service	1.63***	1.51–1.76	1.13**	1.04–1.24	1.82***	1.75–1.88	1.11***	1.07–1.15
Process, plant and machine operatives	1.49***	1.38–1.61	1.12**	1.03–1.22	0.96*	0.92–0.99	0.92***	0.88–0.95
Elementary occupations	1.63***	1.52–1.76	0.95	0.87–1.03	1.53***	1.48–1.58	0.97	0.94–1.01
Female (reference = male)	1.08***	1.05–1.12	1.05*	1.01–1.10	2.28***	2.25–2.31	1.96***	1.93–2.00
Hours worked per week								
15 or less	1.00		1.00		1.00		1.00	
16–30	0.70***	0.66–0.75	0.79***	0.74–0.85	0.98	0.95–1.01	0.96**	0.93–0.99
31–48	0.46***	0.43–0.48	0.57***	0.53–0.60	0.55***	0.53–0.57	0.80***	0.77–0.82
49 or more	0.43***	0.40–0.47	0.56***	0.51–0.61	0.39***	0.38–0.41	0.72***	0.69–0.75
Dependent children (reference = none)	0.65***	0.63–0.67	0.86***	0.85–0.89	0.95***	0.93–0.96	0.98*	0.96–0.997
Caregiver (reference = no)	1.28***	1.23–1.33	0.96*	0.92–0.995	1.37***	1.35–1.39	1.15***	1.13–1.17
Lone parent (reference = no)	1.34***	1.28–1.41	0.96	0.90–1.03	2.31***	2.26–2.36	1.19***	1.15–1.22

* $p < .05$.

** $p < .01$.

*** $p < .001$.

^aModels adjusted for age, marital status, locale of residence, highest level of educational qualification, car ownership, property value and other self-reported chronic conditions.

Table 3. Logistic regression models showing the association of family responsibilities (and interaction with sex) with self-reported mental disorder, stratified by major standard occupational classifications.

	Associate			Process/plant operatives				
	Managers OR (95% CI)	Professional OR (95% CI)	Associate professionals OR (95% CI)	Administrative OR (95% CI)	Skilled OR (95% CI)	Caring/leisure OR (95% CI)	Sales OR (95% CI)	Elementary OR (95% CI)
Dependent children	0.83 (0.72–0.96)*	0.72 (0.64–0.81)***	0.86 (0.75–0.99)*	0.91 (0.77–1.07)	0.90 (0.80–0.998)*	0.95 (0.84–1.07)	0.87 (0.67–1.09)	1.05 (0.93–1.19)
Female x dependent children	0.81 (0.65–1.01)	1.00 (0.89–1.11)	0.97 (0.84–1.11)	0.86 (0.72–1.03)	0.98 (0.86–1.12)	0.97 (0.86–1.09)	0.88 (0.67–1.14)	0.90 (0.73–1.11)
Caregiver	1.36 (1.00–1.85)			0.92 (0.83–1.01)	0.78 (0.55–1.11)		1.46 (1.12–1.90)**	0.95 (0.82–1.10)
Female x caregiver					0.94 (0.74–1.18)		0.62 (0.45–0.83)**	0.88 (0.77–0.996)*
Lone parent	1.12 (0.84–1.48)	1.10 (0.89–1.35)	0.97 (0.76–1.24)	1.37 (0.94–1.99)	0.94 (0.74–1.18)	0.99 (0.84–1.18)	1.22 (0.70–2.10)	1.04 (0.76–1.42)
Female x lone parent				0.68 (0.46–1.01)			0.71 (0.41–1.25)	0.65 (0.40–1.05)

All models are fully adjusted for age, marital status, locale of residence, highest level of educational qualification, car ownership, property value, working hours and other self-reported chronic conditions.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 4. Logistic regression models showing the association of family responsibilities (and interaction with sex) with receiving any twelve month psychotropic medication prescription, stratified by major standard occupational classification.

	Associate			Process/plant operatives				
	Managers OR (95% CI)	Professional OR (95% CI)	Associate professionals OR (95% CI)	Administrative OR (95% CI)	Skilled OR (95% CI)	Caring/leisure OR (95% CI)	Sales OR (95% CI)	Elementary OR (95% CI)
Dependent children	0.96 (0.88–1.04)	0.94 (0.87–1.01)	0.91 (0.84–0.99)*	0.98 (0.90–1.06)	0.95 (0.90–1.00)	0.83 (0.73–0.95)**	0.98 (0.92–1.04)	0.84 (0.78–0.91)***
Female* dependent children	1.13 (1.02–1.26)*	1.10 (1.02–1.19)*	1.19 (1.08–1.32)**	1.04 (0.96–1.14)		1.17 (1.02–1.34)*		1.08 (0.98–1.19)
Caregiver	1.06 (0.99–1.14)	1.14 (1.09–1.19)***	1.22 (1.14–1.30)***	1.17 (1.19–1.21)***	1.08 (1.01–1.15)*	0.94 (0.80–1.12)	1.15 (1.08–1.22)***	1.08 (0.98–1.20)
Female* caregiver						1.26 (1.06–1.50)**		1.15 (1.02–1.30)*
Lone parent	1.09 (0.96–1.22)	0.94 (0.75–1.18)	1.25 (1.12–1.39)**	1.18 (1.12–1.26)***	1.07 (0.96–1.20)	1.20 (1.11–1.29)***	1.04 (0.96–1.13)	1.30 (1.20–1.41)***
Female* lone parent		1.33 (1.06–1.68)*						

All models are fully adjusted for age, marital status, locale of residence, highest level of educational qualification, car ownership, property value, working hours and other self-reported chronic conditions.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

groupings, from fully adjusted logistic regression models, reporting the ORs associated with family demands. They also include interaction terms for gender and each of the family responsibility indicators where there was evidence of an interaction effect based on likelihood ratio tests.

Self-reported mental health

Stratified analysis (Table 3) indicates lower likelihood of CMD associated with having dependent children among individuals working in managerial (OR = 0.83, 95% CI 0.72–0.96), professional (OR = 0.72, 0.64–0.81), associate professional (OR = 0.86, 0.75–0.99) and skilled (OR = 0.90, 0.80–0.998) occupations. For individuals working in sales occupations, the main effect of caregiving indicates increased likelihood of self-reported CMD (OR = 1.46, 1.12–1.90). However, interaction with sex indicates reduced likelihood of CMD for females with caregiving duties, working in sales (OR = 0.62, 0.45–0.83). Among those working in elementary occupations, informal caregiving was associated with reduced likelihood of self-reported CMD (OR = 0.88, 0.77–0.996).

We noted important male–female differences in the association of family responsibilities with prescribed medication across occupation types (Table 4). Individuals working in *associate professional*, *caring services* and *elementary occupations* with dependent children recorded lower likelihoods of receiving prescriptions (OR = 0.91, 95% CI = 0.84–0.99; OR = 0.83, 0.73–0.95; and OR = 0.84, 0.78–0.91, respectively). These main associations, however, were modified with the introduction of the interaction term (sex × dependent children): females with dependent children recorded increased likelihoods among *managers* (OR = 1.13, 1.02–1.26), *professionals* (OR = 1.10, 1.02–1.19), *associate professionals* (OR = 1.19, 1.08–1.32) and *caring, leisure and personal service occupations* (OR = 1.17, 1.02–1.34).

While there was no evidence of a main association between informal caregiving and medication among those working in *caring occupations*, interaction with sex indicates that female informal caregivers recorded a higher likelihood of psychotropic medication (OR = 1.26, 1.06–1.50). Lone parenthood was associated with higher levels of psychotropic medication among *associate professionals* (OR = 1.25, 1.12–1.39), *administrative workers* (OR = 1.18, 1.12–1.26), *caring occupations* (OR = 1.20, 1.11–1.29) and *process and machine operatives* (OR = 1.29, 1.14–1.46); while female lone parents in *professional occupations* also recorded a higher likelihood of medication (OR = 1.33, 1.06–1.68).

Discussion

Our findings

This study provides the first estimates of mental health problems among workers across all occupation types based on population wide administrative data. We examined both chronic self-reported mental health problems and receipt of any prescribed psychotropic medication over a 12-month

period. Almost a fifth of workers had any psychotropic medication prescription. Interestingly, a much lower percentage reported experiencing a chronic mental disorder. We found that self-reported chronic mental ill health was more prevalent among workers in lower paid occupations, while “public-facing” occupations such as those working in caring, leisure and other personal services had the highest rates of medication, after controlling for other factors, including indicators of SEC. We also noted lower risk of psychotropic medication among skilled workers in fully adjusted analysis. In analysis of all workers, consistent findings across both outcomes include higher risk among females, lower risk associated with working greater hours, and lower risk among workers with dependent children.

Inconsistencies are evident, however, with respect to other indicators of family demands: following adjustment for other social determinants and the presence of other health conditions, informal caregivers were less likely to report a mental health problem but more likely to be in receipt of psychotropic medication; while lone parents were no more likely to self-report a mental condition but had higher risk of medication. Interaction analysis stratified by occupation underlines the need for a gender and occupation-based approach to supporting the mental health needs of workers.

Our findings show a considerable difference between the prevalence of self-reported mental health provided by the Census and prevalence indicated by the receipt of psychotropic medications. Several factors may explain this discrepancy. First, the Census question requires persistence over 12 months rather than short-term emotional or mental health problems that are likely to form a substantial sub-population of those receiving medication. Second, people with a mental illness may be overrepresented as non-respondents on the Census. Third, the stigma of mental illness and/or misrecognition may have contributed to low rates of self-report.

Conversely, psychotropic medication may be used for physical health problems, tricyclic anti-depressants for back pain, for example (Staiger et al., 2003) or hypnotics and anxiolytics for transient conditions, such as sleep disorders (Ohayon and Lader, 2002). Despite these caveats, our estimate of 18% based on psychotropic medication is in line with previously reported figures on workers (McManus et al., 2016). Given the greater uncertainties of self-reported chronic mental conditions obtained from Census data, our medication-based findings may provide a more reliable indication of “current” need among the working population.

The remainder of our discussion therefore considers the context and implications of our findings based on receipt of medication. We found higher risk in *public-facing* occupations, such as sales, administrative or caring roles, all often characterised by low autonomy, higher job insecurity and effort–reward imbalance and linked to poorer mental health outcomes (Clausen et al., 2021; Meltzer et al., 2010; Niedhammer et al., 2006). This broad group includes child-care providers and caregiving occupations associated with high physical and emotional demands. Adverse mental

health outcomes among care workers have been evidenced in earlier studies, which highlight the impact of working conditions, role stress and burnout (Acker, 2012; Curran et al., 2021; Peterson et al., 2008; Rantonen et al., 2017). Reduced risk among workers with skilled trade occupations is consistent with evidence on the latent benefits of working, including higher levels of autonomy and greater job satisfaction among workers who use their skills in their everyday work (Jahoda, 1988; Warr, 1987).

Higher likelihood of mental health problems among females is consistent with previous research on workers and mental health (Inoue et al., 2010; Stansfeld et al., 2011) and reflective of wider mental health epidemiology (Boyd et al., 2015). We also found that the likelihood of mental health problems decreased as working hours increased compared to those who worked 15 hours or less. However, those on part-time working are more likely to be in poor health and disability, and on welfare support; factors associated with mental health problems. Unfortunately, we were unable to examine the impact of shift work, which has been shown to have detrimental mental health effects if undertaken for a prolonged period (Bara & Arber, 2009).

Our study also sought to explore the association of family demands with mental health problems among workers. Individuals who manage multiple roles in relation to child-care and family caregiving may be at increased risk of stress and adverse mental health outcomes due to competing responsibilities of family and work demands (Chandola et al., 2004; Melchior et al., 2007; Oomens et al., 2007). Our analysis points to elevated risk of psychotropic medication among informal caregivers, as well as lone parents, reflecting the *role strain perspective* alluded to by Oomens et al. (2007). Our study, however, found a protective main effect for the presence of dependent children (for both self-reported CMD and psychotropic medication), which aligns with the *role accumulation perspective* (Oomens et al., 2007), which proposes that multiple social roles generally have a positive effect on mental health.

Further interaction analysis stratified by occupation underlines the need for a gender and occupation-based approach to supporting the mental health needs of workers and particular consideration of risk of mental health difficulties among workers with family responsibilities. Our analysis highlights the needs of lone parents across a range of occupations, and of informal caregivers in more skilled/professional occupation types. Interaction analysis suggests higher risk of psychotropic medication among females with dependent children in higher paid occupations. Finally, female informal caregivers working in “caring, leisure and other personal service” occupations had higher risk of medication, underlining mental health needs of females who care for others in both an informal and formal capacity.

Strengths and limitations

In this study, we extend the evidence base related to occupations and mental health by providing the first estimates of mental health problems among workers across occupation

types based on population wide administrative data. Thus, the availability of a large population-based dataset allowed a nuanced analysis of the risk of mental health problems across occupations and the association of family demands, controlling for other key characteristics. While evidence on the validity of self-reported mental disorders from Census data is limited, earlier studies on self-report of chronic conditions point to reasonable accuracy (Chapman, 2012; Lee, 2000). Nonetheless, we have previously noted several factors that may contribute to low rates of self-report. We also acknowledge limitations relating to our second indicator based on prescriptions for psychotropic medication. Estimates are based on analysis of EPD, an administrative data source, detailing prescriptions dispensed only. Details of the conditions that these medications were prescribed for was not available and the impact of non-psychiatric prescribing on estimates has also previously been considered.

Conclusion

The United Kingdom (UK) is facing a major mental health at work challenge, with one in six workers experiencing a mental health problem at any one time, costing businesses an estimated £42–£45 billion annually due to sick leave, reduced productivity and staff turnover (Deloitte, 2020). The government commissioned “Thriving at Work” review (Department for Work and Pensions and Department for Health and Social Care, 2017) outlines *core standards* that should be adopted by *all UK companies*, including implementation of a *mental health at work plan*. Employers and managers have a moral obligation, as well as economic motivation, to foster mental wellbeing in the workplace and should develop tailored work plans that consider occupation specific risks and needs of their employees, based on work/family dynamics and other risk factors.

Our study, based on population wide administrative data, shows that mental ill-health rates, both in terms of self-report and psychotropic medication, vary substantially across major and sub-major and occupation categories. The risk factors are complex, and we provide insight into the association of occupation type, sex, and family demands. Future development of mental health at work plans should take cognisance of both occupation specific mental health risk and wider family circumstances to support workers’ mental wellbeing most effectively.

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Author Statement

FF MR EC and GL were involved in the literature search, study design and data interpretation. FF EC and MR were involved in data acquisition and undertook formal analysis. FF drafted the original manuscript, which was reviewed and edited by MR EC and GL. All authors had access to the data. FF and MR verified the underlying data and accept responsibility for the decision to submit for publication.

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Data Availability Statement

The linked administrative data that support the findings are safeguarded and only available to members of the research team. Syntax files developed to produce findings reported in this study are available on request from the corresponding author.

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