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Physical ill-health and severe mental illness: longitudinal study using hospital data in NI

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Terminology and key facts

- "Severe mental illness refers to those people with psychological problems that are often so debilitating that their ability to engage in functional and occupational activities is severely impaired."
- Bipolar disorder and schizophrenia are the most common severe mental health problems– 1/100 people will have a diagnosis of either bipolar disorder or schizophrenia in their lifetime.

- 25% of people who experience a psychotic episode will recover within five years.
- More susceptible to obesity, diabetes, asthma, chronic obstructive pulmonary disease and cardiovascular disease (CVD) than general population

Aims and Method

To examine: The relationship between ***SMI***, selected *chronic physical disorders* and *mortality* in a population attending at hospital settings in NI between 2010 and 2020.

Population: All persons aged 20+ normally resident in NI, and registered with a GP in January 2010

- **Prevalence and Age Standardised Rates of Schizophrenia and Bi-Polar Disorder**
- **Factors associated with SMI**
- **Presence of Comorbid physical disorders ****
- **All-cause mortality**

- ***chronic kidney disease*, *diabetes mellitus*, *COPD*, *CHF*, *myocardial infarction*, *stroke* & *malignant neoplasms*.

- age, sex, locale of residence and NI-MDM (social deprivation)

SMI prevalence

- 929,412 patients – 413,397 (44.5%) male and 516,015 (55.5%) female
- Mean ages: **SMI Males**: 48.3 (SD=16.4) **Non-SMI Males**: 50.8 (SD=17.2) [Z=-18.901 (p=0.000)]

SMI Females: 53.8 (SD=17.5) **Non-SMI Females**: 49.3 (SD=19.0) [Z=10.263 (p=0.000)]

- 10,965 (**1.2**%) recorded SMI
- Females=51.5% (5,648)
- Schizophrenia=7,466 (64.7%)
- Bipolar disorder=4065 (35.3%)
- * 566 (4.9%) recorded both BPD and Schizophrenia

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Socio-demographic and clinical characteristics associated with SMI

- **SMI diagnosis** higher likelihoods in:

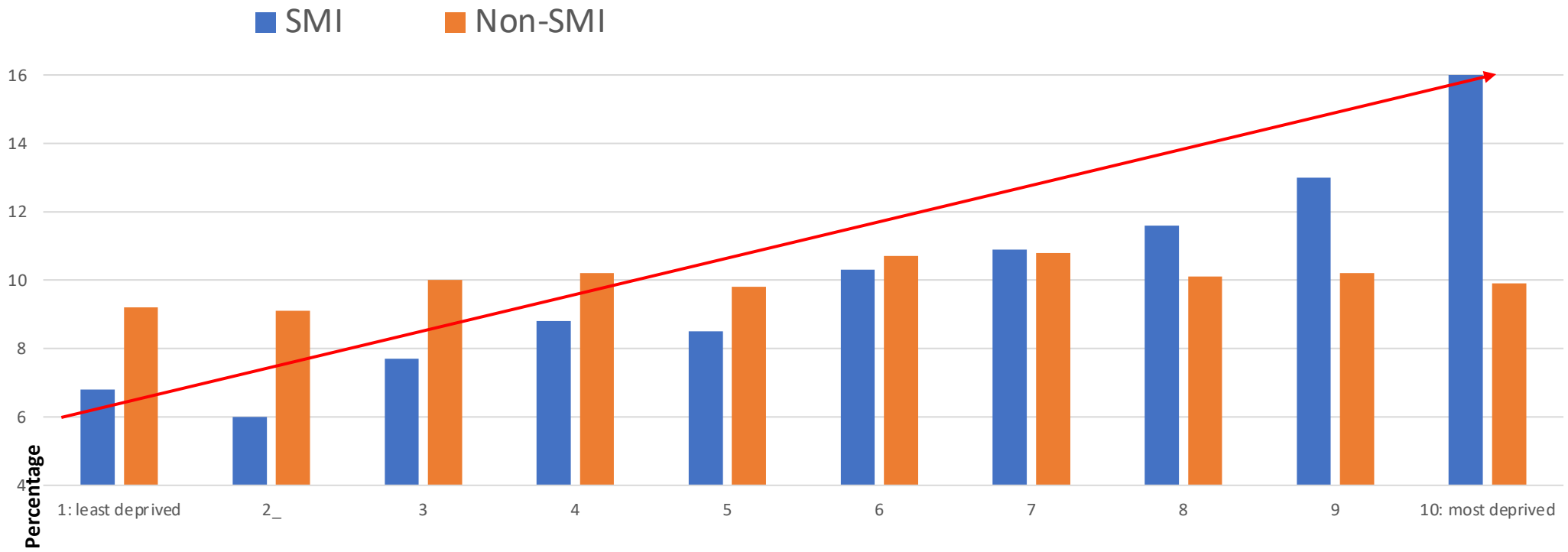
  Males (OR=1.47: 1.36, 1.59)

  Social deprivation (OR=1.07: 1.05, 1.09)

  Urban areas (OR=2.06: 1.80, 2.36) and

- 4+ physical conditions (OR=3.52: 2.30, 5.39)

Area-level deprivation:
Comparison of people with SMI and without SMI



Association between *SMI* and 7 Conditions:
Fully adjusted LR

Age at first hospital referral: differences between SMI and Non-SMI

	2015	Non-SMI	SMI	non-SMI	SMI
Condition	OR (95% CI)	Male		Female	
kidney disease	2.47(2.19, 2.79)***	73 (73, 73)	66 (65, 67) Z=1.41 (p<0.001)	76 (76, 76)	71 (70, 72) Z=12.12 (p<0.0001)
diabetes mellitus	2.01 (1.78, 2.28)***	68 (68, 68)	60 (59, 61) Z=16.0 (p<0.001)	70 (70, 70)	64 (64, 66) Z=11.39 (p<0.0001)
COPD	2.75(2.42, 3.12)***	71 (71, 71)	62 (61, 63) Z=20.11 (p<0.001)	70 (70, 70)	63 (61, 64) Z=15.15 (p<0.001)
chronic heart failure	1.59 (1.30, 1.94)***	76 (76,76)	69 (67, 71) Z=10.61 (p<0.001)	81 (81,81)	75 (73, 76) Z=11.74 (p<0.001)
myocardial infarction	1.25 (0.91, 1.73)	67 (67, 68)	65 (62, 68) Z=3.75 (p<0.0002)	76 (76, 77)	72 (70, 76) Z=3.63 (p<0.0003)
stroke	1.26 (0.93, 1.72)	72 (72, 72)	66 (63, 68) Z=7.56 (p<0.001)	78 (77, 79)	74 (72, 76) Z=5.11 (p<0.00!)
malignant neoplasms	0.82(0.69, 0.98)*	71 (70, 71)	66 (65, 67) Z=9.32 (p<0.001)	68 (68, 68)	66 (65, 68) Z=2.83 (p<0.004)

logistic regression models are fully adjusted for age, gender, small-area deprivation and locale of residence***=p<0.001; **=p<0.005; *=p<0.05

SMI, physical health multimorbidity and all-cause mortality

ALL: 929,412/ 156,029 patients died (16.78%) during the follow-up period

SMI: 10,965/ 3,393 died (31%) **Non-SMI** (17.26%).

SMI – **2 X excess** likelihood (***HR=1.97: 95% CI=1.91, 2.04***)

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***All-cause mortality*: association with serious mental illness (SMI), (2010-2021).**
Data represents Hazard Ratios (HR) and 95% Confidence Intervals

	M1: SMI only HR (95% CI)	M2: M1 + Num conditions HR (95% CI)	M3: M2 + age/sex HR (95% CI)	M4: M3 + SEC HR (95% CI)
SMI	2.09 (2.03, 2.17)***	1.52 (1.47,1.57)***	2.02 (1.95, 2.09)***	**1.97 (1.91, 2.04)***
Co-morbidities (1-7)		2.43 (2.42, 2.44)***	1.60 (1.57, 1.59)***	**1.57 (1.56, 1.58)***
age: 1 year increase			1.08 (1.08, 1.08)***	**1.08 (1.08, 1.08)***
female (reference=male)			0.89 (0.88, 0.89)***	**0.87 (0.87, 0.88)***
area-level deprivation: (most to least deprived)$				**1.02 (1.02, 1.03)***
locale of residence				
urban				1.00
intermediate				**0.91 (0.90, 0.93)***
rural				**0.81 (0.80, 0.82)***
schizophrenia	2.41 (2.32, 2.51)***	1.73 (1.66, 1.80)***	2.13 (2.05, 2.22)***	**2.07 (1.99, 2.15)***
bipolar disorder	1.51 (1.40, 1.61)***	1.16 (1.08, 1.24)***	1.70 (1.59, 1.82)***	**1.68 (1.57, 1.80)***

Key points

- People with SMI – are more likely to live in poorer urban neighbourhoods
- Physical health multimorbidity and all-cause mortality much higher in persons with SMI
- Apparent lower risk of for cancers – may be “overshadowed” by other problems or die from other causes
- Multiple morbidities associated with SMI may drive excess mortality
- SMI patients are significantly younger at referral to treatment for these conditions -
- Relatively premature death suggests that these conditions are quite advanced.

Conclusions

- Evidence of persistent health inequalities for people with SMI
- Higher multimorbidity may add complexity and increase fragmentation of care
- Need for better health surveillance and early intervention
- More assertive health promotion and psychoeducational programmes.

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Mind the gap: an administrative data analysis of dental treatment outcomes and severe mental illness

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ORIGINAL ARTICLE

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Mind the gap: an administrative data analysis of dental treatment outcomes and severe mental illness

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ABSTRACT

Background: Oral health of people with severe mental illness (SMI) remains an important public health issue, despite evidence pointing suboptimal dental health outcomes in this population.

Aims: We test the hypotheses that individuals with SMI have lower contact with dental services and higher levels of fillings and extractions. We also examine effect modification by age-group.

Methods: We used linked administrative data from general practitioner (GP), hospital and dental records to examine dental service use and treatments (extractions, fillings, crowns and x-rays) among the Northern Ireland hospital population between January 2015 and November 2019 ($N = 798{,}564$).

Results: After adjusting for available socio-demographic characteristics, analysis indicated lower levels of dental service use (OR = 0.80, 95% CI = 0.77, 0.84), including lower likelihood of fillings (OR = 0.81, 0.77, 0.84) and x-rays (OR = 0.77, 0.74, 0.81), but higher levels of extractions (OR = 1.23, 1.18, 1.29) among patients with SMI. We also found effect modification by age-group, with older individuals with SMI less likely to have each of the four dental treatments.

Conclusions: We suggest that in the general area of physical healthcare for people with SMI, oral healthcare is neglected. There is a need for improved understanding of the barriers to routine care and treatment, and development of psychoeducational interventions.

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Background

- Little attention given to oral health disparities despite concerns about suboptimal dental health outcomes.
- A meta-analysis found that people with SMI were 2.8 times more likely to have lost all their teeth and had significantly higher rates of decayed, missing and filled teeth (Kisely et al., 2015).
- Poor dental health is associated with other life-limiting conditions (LLCs) and has implications for service use and provision and premature mortality
- Need for evidence on service use and oral health among people with SMI

Aim

To examine the association of SMI with dental service engagement and dental treatment outcomes among the NI hospital population.

We hypothesised that individuals with SMI have:
a) lower contact with dental services;
b) ***higher likelihoods of extractions and fillings than people in the general hospital population.***

Additionally, we examine the association between SMI and crowns and X-rays and explore effect modification by age in relation to all dental health outcomes.

Linked administrative data accessed through Honest Broker Service (HBS)

GP Patient Registrations Index:

Details of all patients registered in January 2013 aged 15+. Limited socio-demographic variables.

Patient Administration System (PAS) HIS data (2013-Oct 2019):

To identify individuals with SMI based on ICD code.

Dental Payment System Data (2015-Oct 2019):

To examine dental service engagement and dental health outcomes.

Final sample for analysis N=798,564

- The HBS provides anonymised or aggregated data from the Regional Data Warehouse, held within Business Services Organisation (BSO), to researchers carrying out ethical, National Research Ethics Service (NRES) approved health and social care related research.
- All HBS processes are in line with Data Protection, confidentiality requirements and the ICO's Codes of Practice.
- Datasets have no identifiable individual level data and are totally anonymised prior to handover to the research team.
- HBS is a safe and secure environment in which the data are processed and, in some cases, linked to other data before being provided in an approved format to the research team in a Safe Haven setting.
- Where more than one data source is required, datasets are linked in the HBS secure environment using the patient healthcard registration number as the unique identifier. This, and any other potentially patient identifiable data, is removed from the dataset before it is provided to the research team in the safe haven.

Methods

Five key outcomes

- Any dental service engagement;
- Any extractions, fillings, crowns, x-rays.

Explanatory Variables

- **Severe Mental Illness (SMI)**:
  - Identified individuals with **ICD codes F20-F29 (schizophrenia, schizotypal and delusional disorders)** or ***F31*** **(bipolar disorder)** recorded as their primary or subsidiary diagnosis at any point between January 2013 and November 2019.
- Age-group, sex, marital status, settlement band (urban, intermediate, rural), deprivation (in deciles).

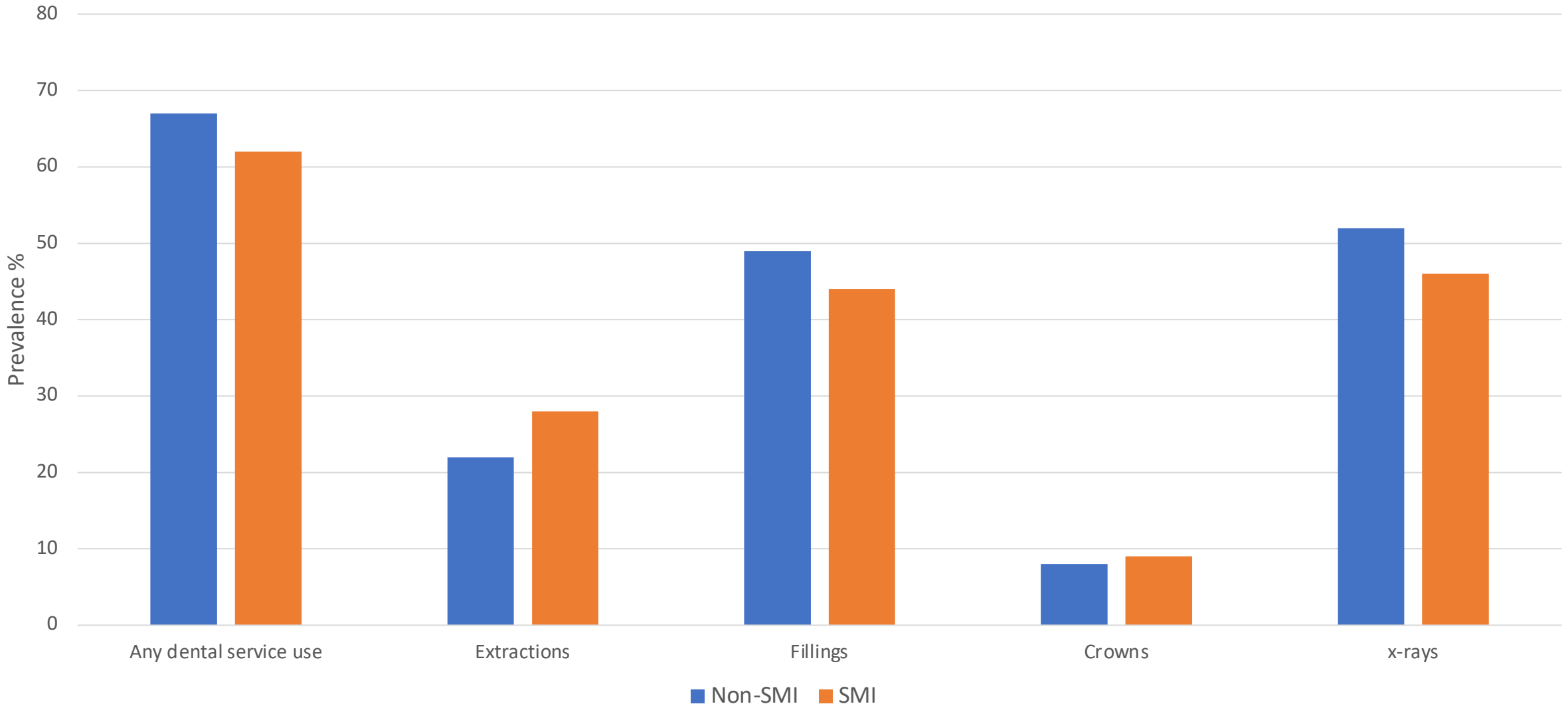
Analysis

-Frequencies examined population characteristics for persons aged 15 and over.

-Prevalence of dental outcomes determined as the proportion recording a dental visit/treatment (2015-19)

-Logistic regression models examined association of SMI and other explanatory variables with each outcome..

Prevalence of dental service use and treatments for patients with and without SMI



Severe mental illness and dental care:
Logistic regression: (adjusted for sex, age, rurality, neighbourhood deprivation

- People with sever mental illness - Less likely to have:

  Any dental service (OR=0.80, CI=0.77-0.84)

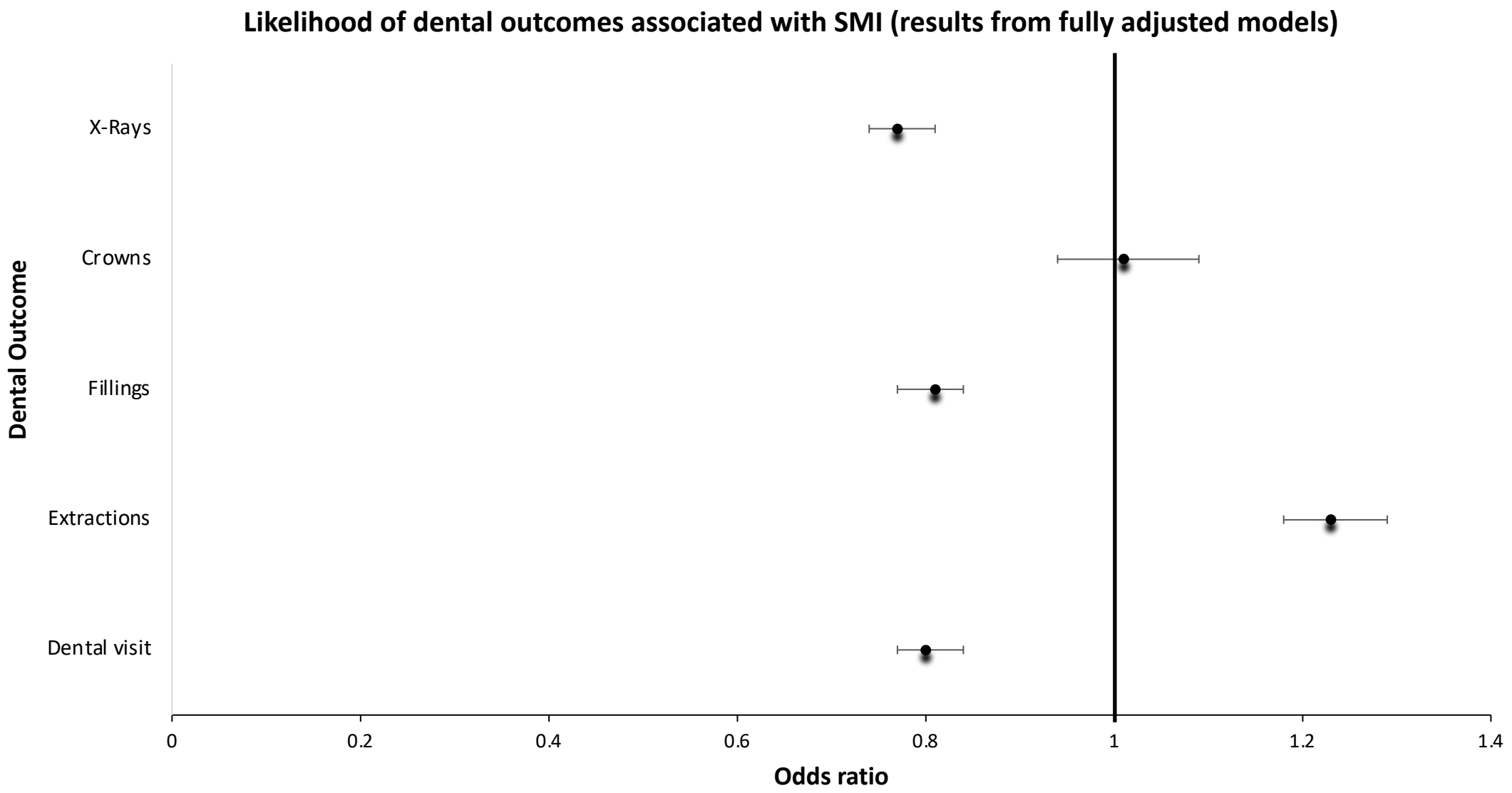
  Fillings (OR = 0.81, 0.77, 0.84)

  x-rays (OR = 0.77, 0.74, 0.81),

- More likely to have

  Extractions (OR = 1.23, 1.18, 1.29)

- *Less likelihood of any treatment in rural areas*
- *Significant effects for deprivation index*
- *Females more likely than males to have received treatments.*
- *Ageing was associated with lower likelihood of any dental service use (including fillings and x-rays)*
- *Extractions and crowns, more likely at middle-ages (Reducing at older ages)*


Likelihood of dental outcomes associated with SMI (results from fully adjusted models)
Dental Outcome
X-Rays
Crowns
Fillings
Extractions
Dental visit
0
0.2
0.4
0.6
0.8
1
1.2
1.4
Odds ratio

Interaction of age and SMI

- Strong evidence that the association of SMI and dental outcomes is modified by age-group.

- Ageing per-se associated with higher likelihood of extractions, but interaction analysis shows lower likelihood of extractions among older individuals **with SMI**.

Conclusion

- Our findings of ***lower engagement with dental services***, **lower levels of *remedial* treatments** and ***higher levels of tooth loss***
- Concerns about availability, access, and promotion of routine dental care for people with SMI.
- There is a need for improved understanding of barriers to treatment and development of psychoeducational interventions.