REPORT ON PATIENT ACTIVATION MEASURE AND SOCIAL PRESCRIBING

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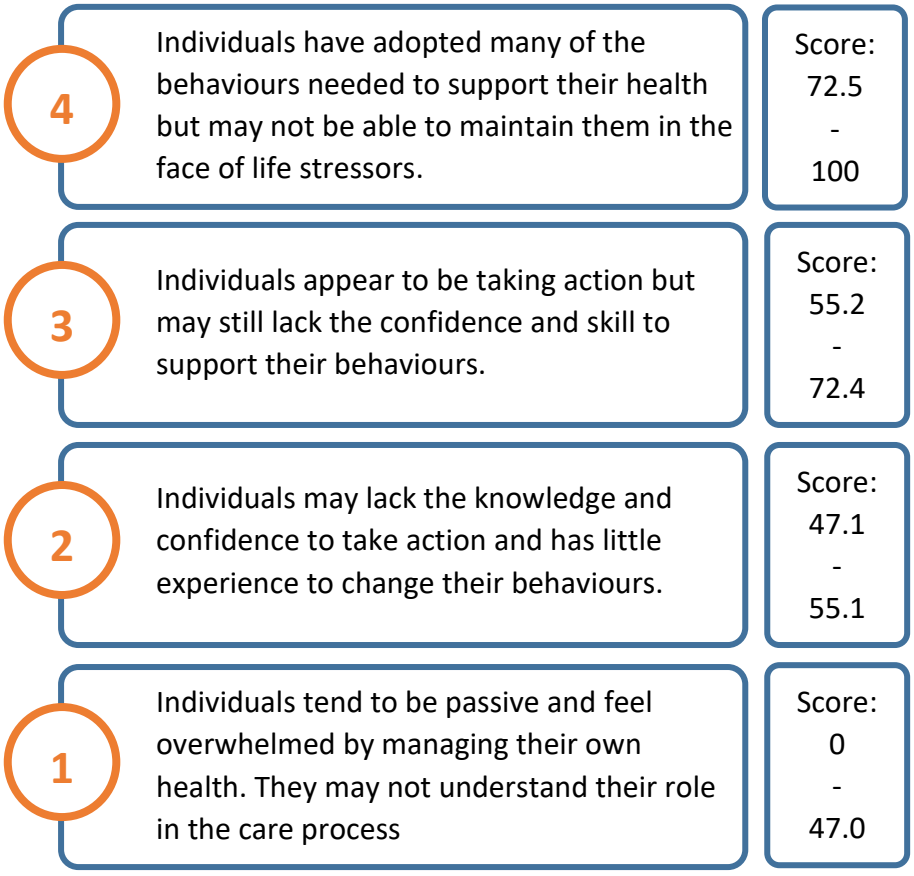
Part I

Patient Activation Measure (PAM)

1. PAM: Introduction

Patient Activation Measure (PAM) is an instrument which assesses patients' knowledge, skills and confidence for self-managing their health and long-term conditions. It was developed in the USA by Hibbard et al. [1]. The original PAM has 22 items. A shorter version of 13 items was developed to enhance its feasibility [2]. Both PAM-22 and PAM-13 have been proven to be reliable and valid across different patient groups and in different countries [3–8]. Starting from 2016, NHS England and Improvement acquired a five-year licence to use PAM-13 as part of the personalised care programme. Since then, PAM information has been routinely collected by general practices that are licenced in England.

PAM is scored on a scale from 0 to 100, with a greater value indicating higher activation. Based on the scores, patients can be sorted into four activation levels as shown in Figure 1.1 [9,10].



Source: Adapted from Hibbard & Gilburt (2014)

Figure 1.1 Four levels of PAM

PAM has been widely used in the United States. There is abundant evidence to link patient activation to health outcomes. For example, Remmers et al. [11] showed that higher PAM scores were associated with better rates for a variety of health testing results amongst patients with

diabetes. A study by Mitchell, et al. [12] found that patients with lower PAM were at a higher rate of readmission in the 30 days after hospital discharge. It was also reported that patients with higher activation scores had lower health care costs [9]. However, most of the existing evidence was drawn from US data. There is very limited evidence in the UK where the health care system is vastly different from the US.

2. PAM: Cross-sectional Analysis

2.1 Data

In this part of analysis, we focus on patients who had at least one valid PAM. If a patient has more than one PAM, then the first one is used. As PAM was not officially adopted by the NHS until 2016, any PAM that was assessed before 2016 is excluded. The analysis also excludes patients under 18 years of age. Further, we exclude any PAM taken after 30/11/2018 as the allowed follow-up period is shorter than one year. Patients who died within the one-year follow-up are also excluded (5%). This leaves us 18,888 patients.

2.2 PAM cohort profile

Figure 2.1 presents the distribution of PAM scores and levels. About 28% of patients are at PAM level 1, 28% at level 2, 30% at level 3 and 14% at level 4. Among patients at level 1, the majority of them have a score from 30 to 47. Only 13% of level 1 patients have a score below 30.

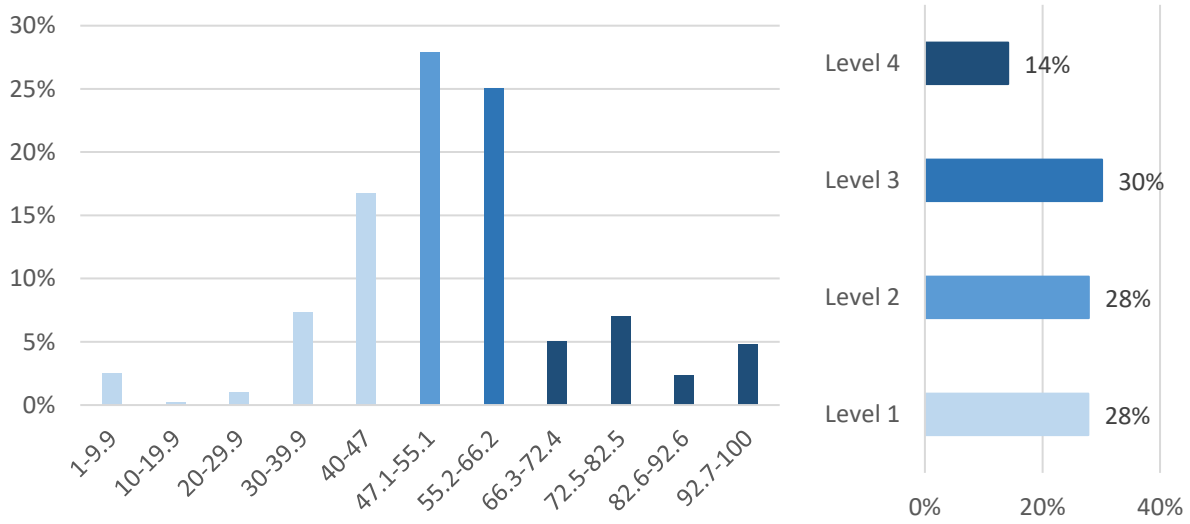


Figure 2.1 Distribution of PAM scores and PAM levels

As shown in Figure 2.2(a), the PAM cohort is ethnically diverse. About 36% of patients are recorded as white, 32% Asian, 8% black, 7% from a mixed ethnic background and 16% from others. Among all patients, 56% are women and 44% are men. As shown in Figure 2.2b, more than 80% of patients are aged 60 or over. Only 10% of them are below 50. A majority (91%) of patients have at least one-term conditions (Figure 2.3). Figure 2.4 presents the prevalence of a list of common conditions. The most prevalent condition is hypertension (57%), followed

by 36% diabetes, 23% obesity and so forth. Notably, there are also high percentages of people with depression and anxiety, 18% and 15% respectively.

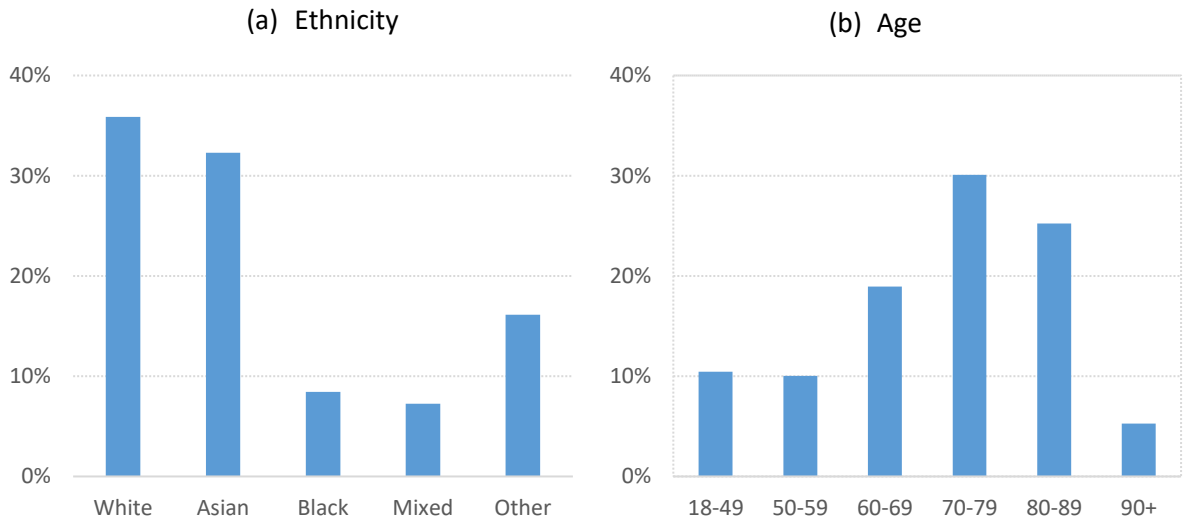


Figure 2.2 Ethnicity and age profile of the PAM cohort

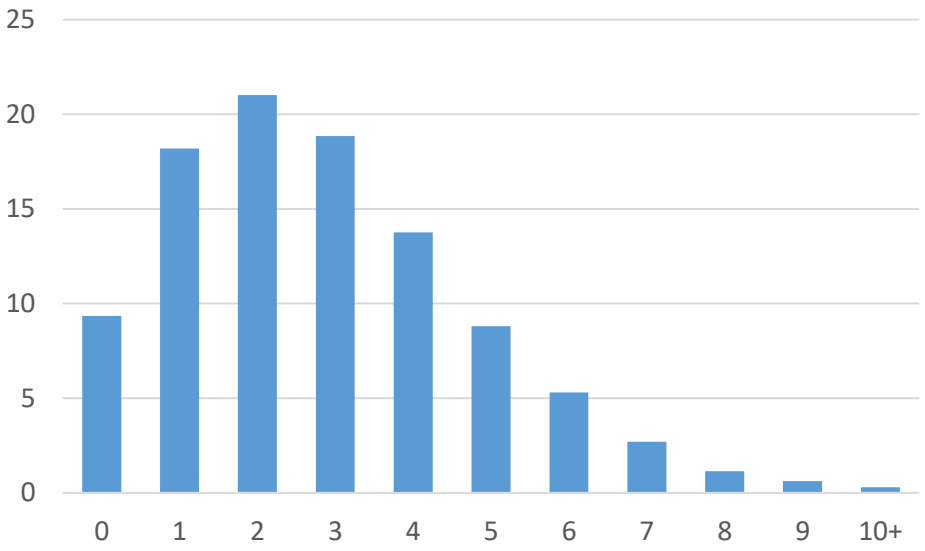


Figure 2.3 Distribution of the number of long-term conditions

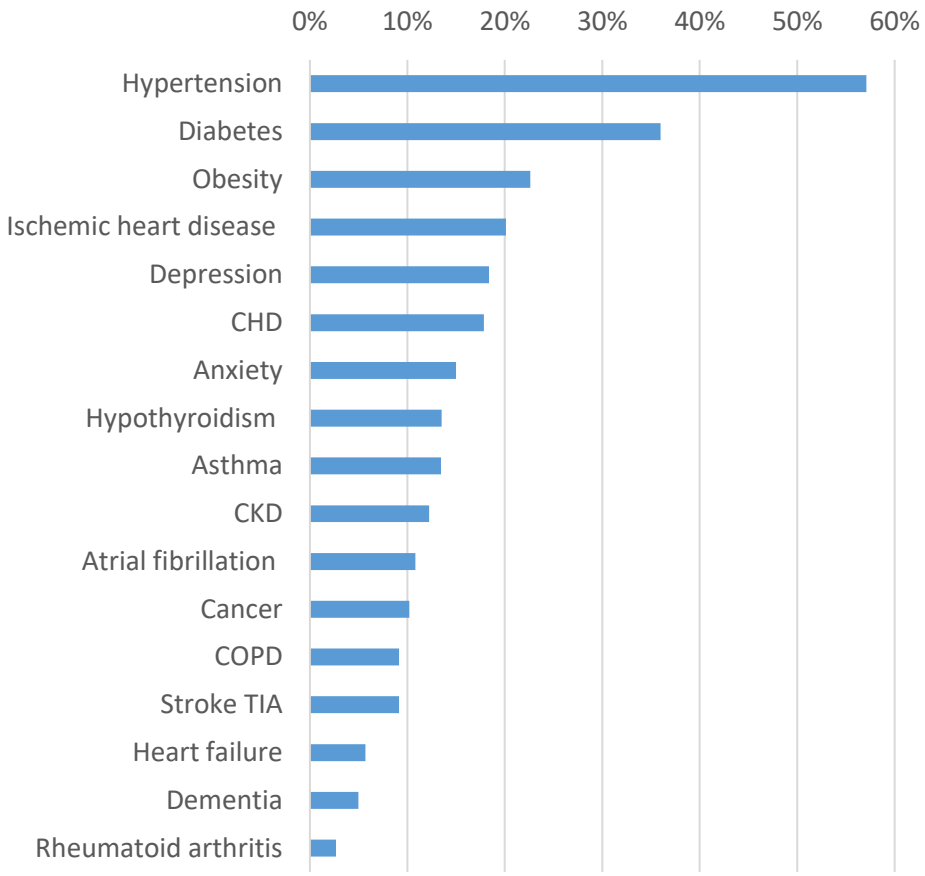


Figure 2.4 Prevalence of individual long-term conditions

Figure 2.5 shows the distribution of boroughs in the PAM cohort in comparison with the patient population in North West London. It suggest that PAM is more widely used in some boroughs than others.

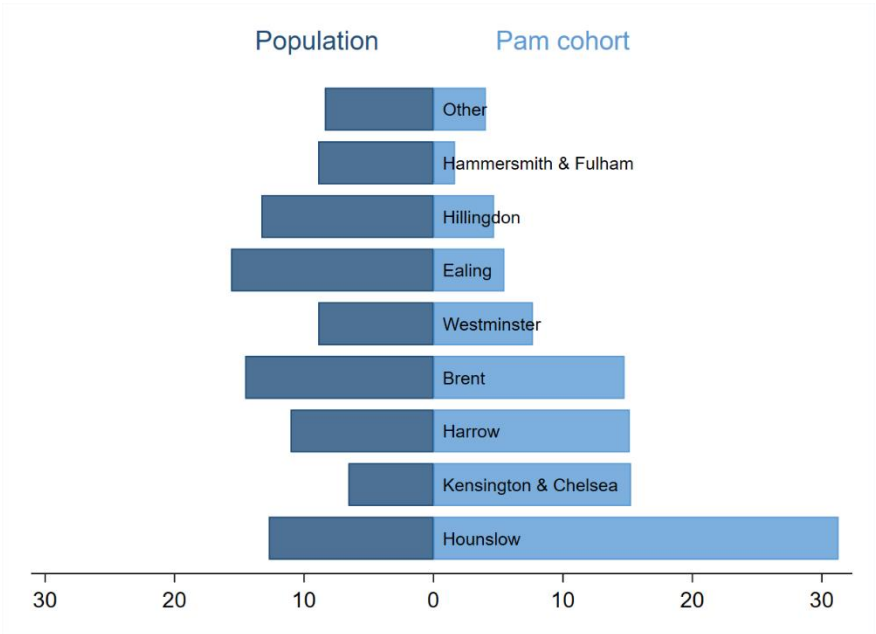


Figure 2.5 Distribution across boroughs of PAM cohort compared with patient population

Comparing men with women, there is not much gender difference in PAM levels (Figure 2.6a). On average, patients with a mixed ethnic background tend to score slightly higher compared with other ethnic groups (Figure 2.6b). As shown in Figure 2.6c, PAM scores does not vary much across deprivation levels. However, they decrease significantly with age (Figure 2.6d).

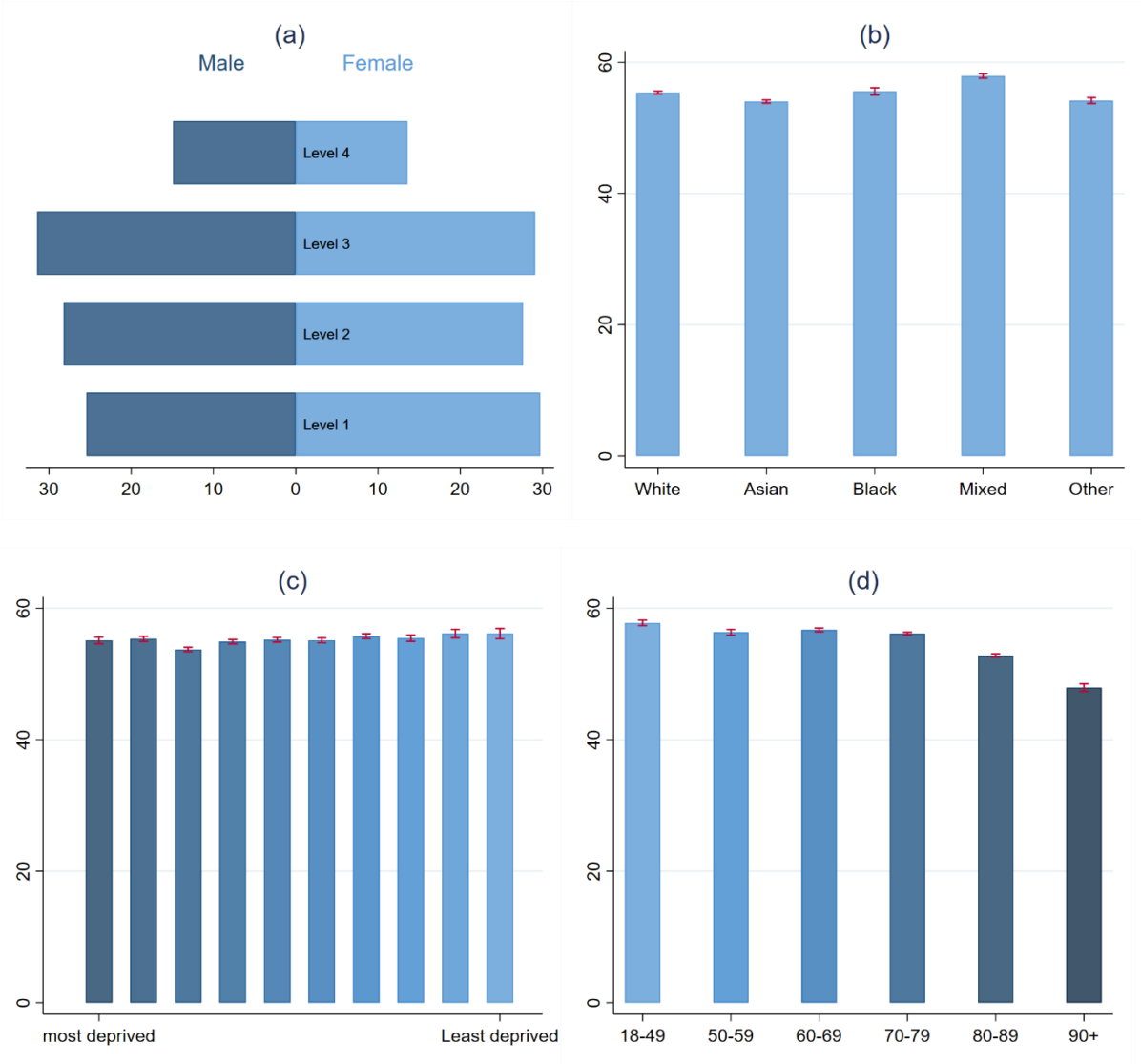


Figure 2.6 PAM by demographic characteristics

2.3 Health service utilisation: bivariate analysis

2.3.1 Primary care

Figure 2.7(a) shows the distribution of the number of primary care contacts within the one-year follow up. Figure 2.7(b) compares the average primary care contacts across PAM levels. It is clear that patients at higher PAM levels (more active) tend to use primary care services less on average.

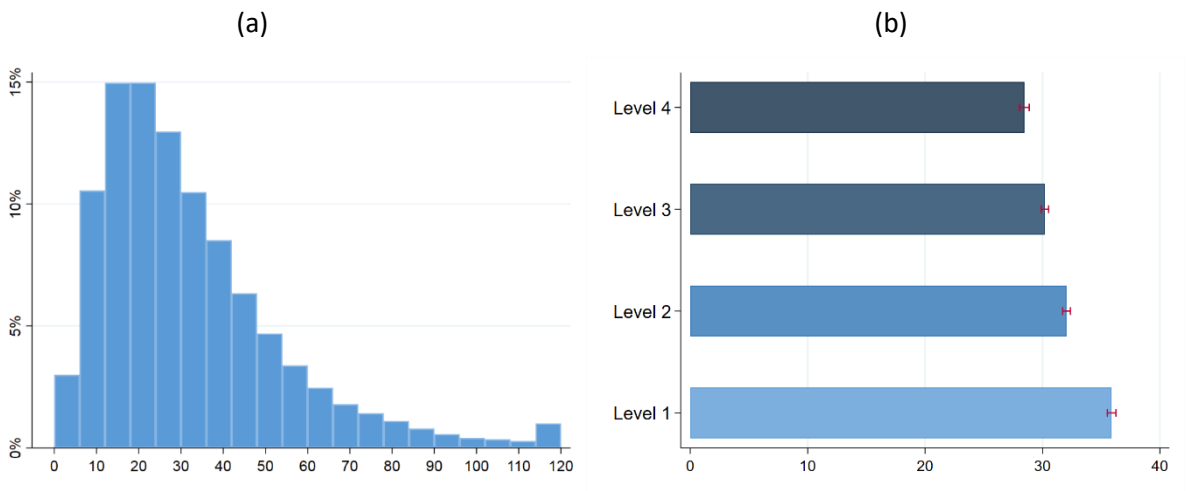


Figure 2.7 Distribution of the number of primary care contacts

Primary care service can be further broken down into GP and other primary care (e.g. nurse) contacts. Over all, only around 19% of the primary care utilisations are GP visits, the distribution of which can be found in Figure 2.8(a). We see that about 45% of patients do not see their GPs within the follow-up. About 21% of patients visit their GPs more than 10 times a year. When focusing on GP contacts, we see that patients at higher PAM levels see their GPs less often on average (Figure 2.8(b)).

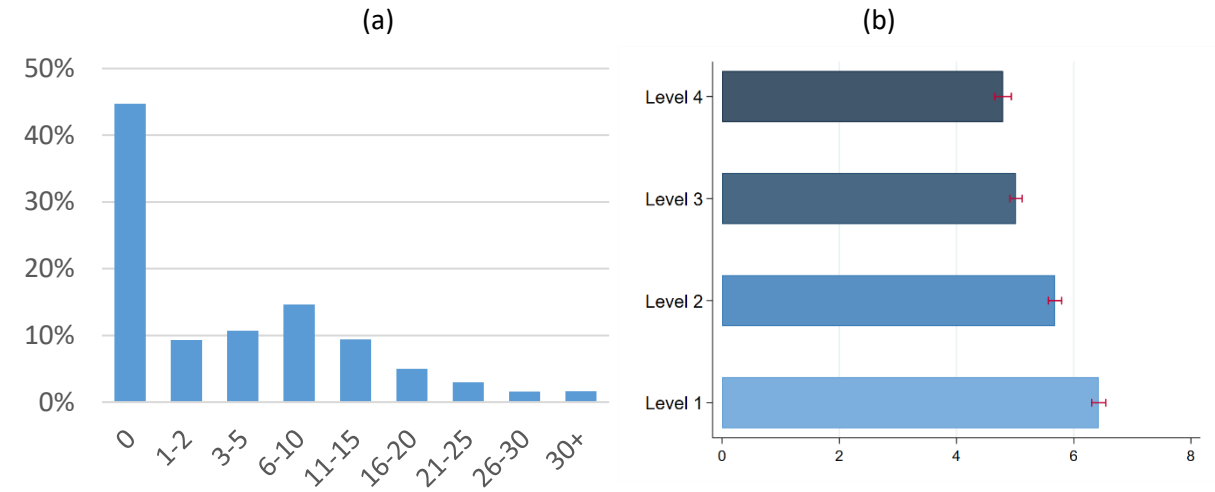


Figure 2.8 Distribution of the number of GP contacts

2.3.2 Admitted patient care

Figure 2.9 presents the percentages of patients who have a hospital admission within the one-year follow-up by PAM levels. We see that patients at level 1 (least active) are less likely to have elective admissions compared with other levels (Figure 2.9a). However, they are more likely to have emergency admissions (Figure 2.9b).

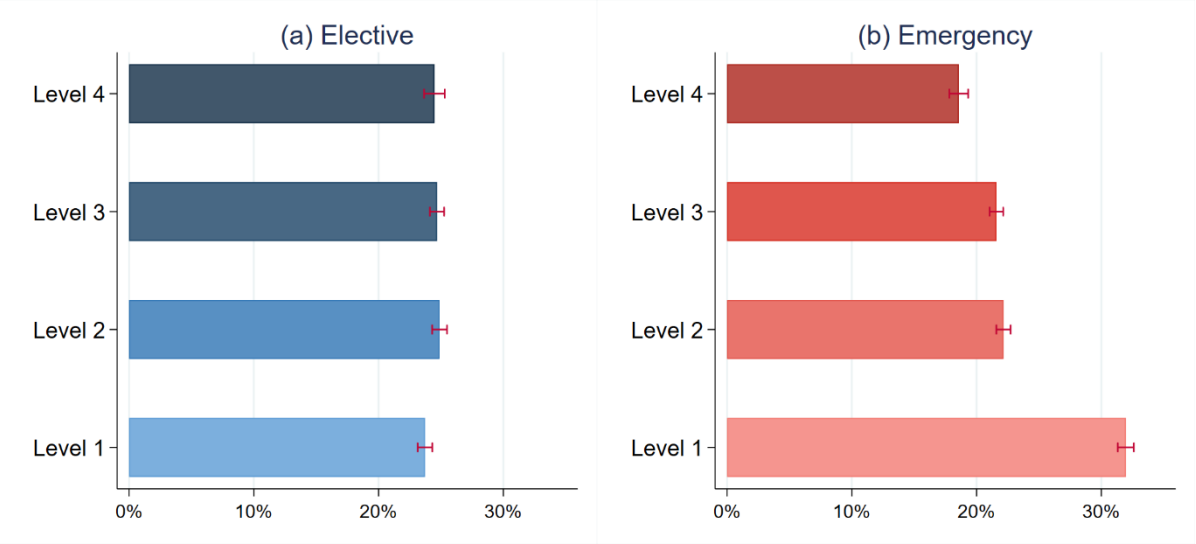


Figure 2.9 Elective and emergency hospital admissions by PAM levels

2.3.3 Outpatient

Figure 2.10a shows the distribution of the number of outpatient attendance. About 23% patients do not use outpatient services within the follow-up period. More than three quarters of them have at least one outpatient attendance. As shown in Figure 2.10b, level 4 patients appear to use outpatient services less often, but the difference is quite small. This is not entirely surprising as outpatient care covers a wide range of services which may indicate proactive self-management of health and well-being, as well as health deterioration due to the lack of patient activation.

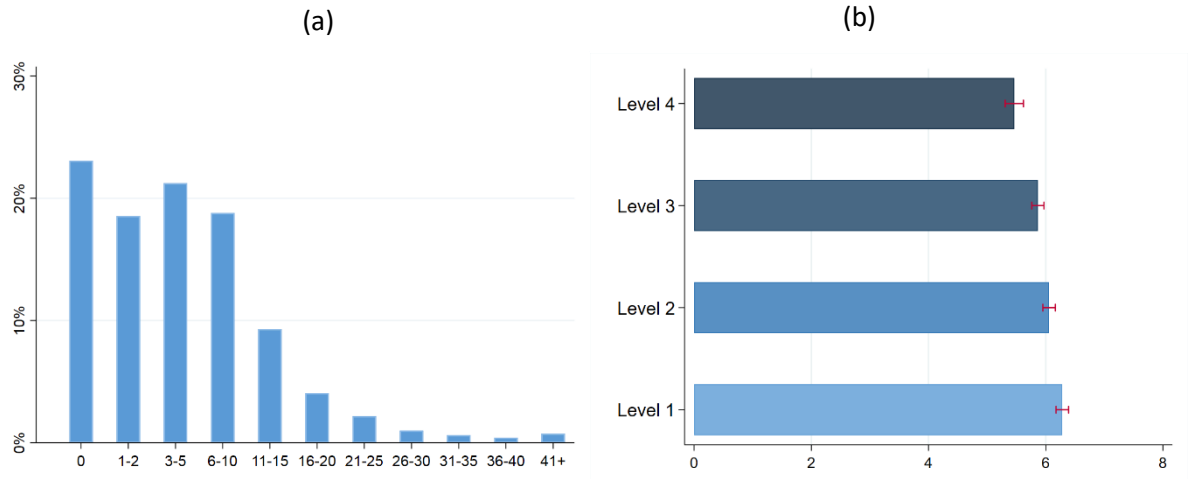


Figure 2.10 Distribution of the number of outpatient attendance

To get a better insight, we can look at non-attendances of outpatient appointments. Restricting to patients who use outpatient services, Figure 2.11 compares the percentage of non-attendance across PAM levels. Not surprisingly, patients at lower PAM levels, in particular those at level 1, are more likely to miss their appointments (without notification).

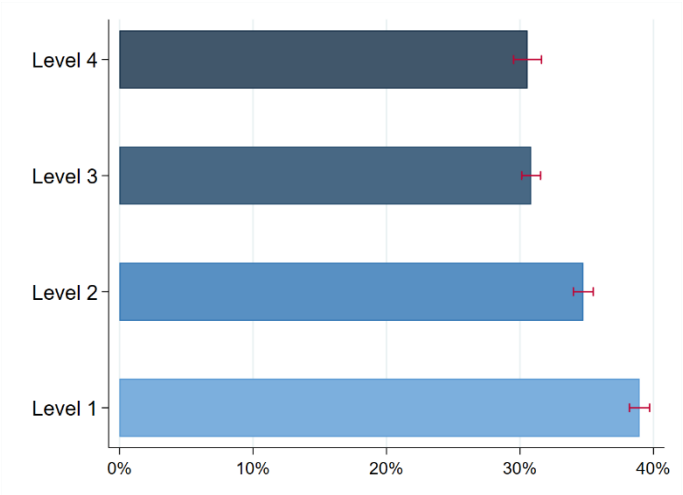


Figure 2.11 Percentages of non-attendances by PAM levels

2.3.4 A&E

Finally, we look at the number of A&E visits. From Figure 2.12a, we see that about 58% of patients do not have any A&E visits during the follow-up period. About 21% of patients have repeated A&E visits (twice or more a year). Figure 2.12b shows the percentage of patients who have an A&E visits by PAM levels. It is clear that patients at lower PAM levels are more likely to have A&E visits compared with patients at higher levels.

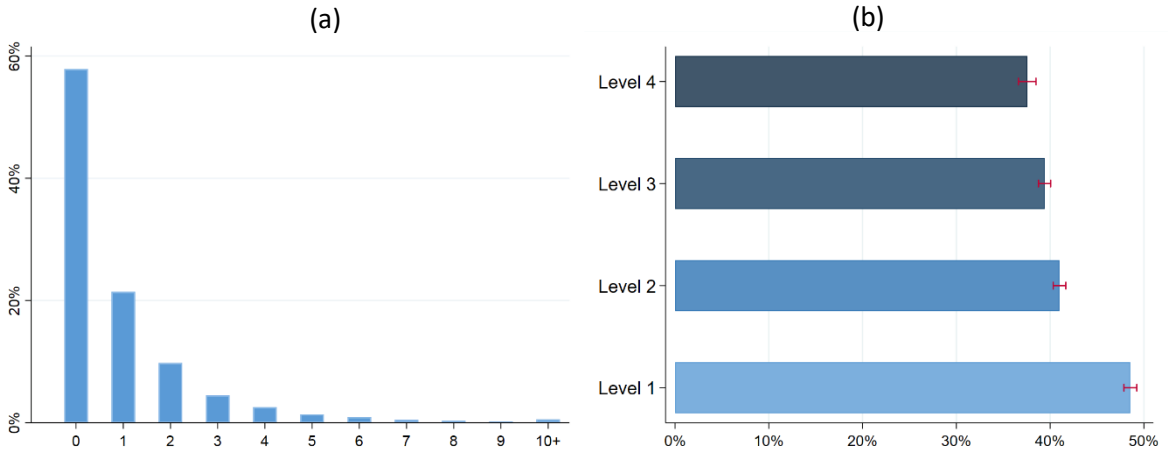


Figure 2.12 Distribution of A&E attendances and percentages by PAM levels

2.4 Health service utilisation: multiple regression analysis

In the last section, we explore the relationship between PAM and different aspects of health service utilisation. The results from these bivariate analysis are quite revealing. However, a major drawback is that the observed relationship could be spuriously driven by other factors. For instance, it is likely that patient activation decreases with age and we know that older people are more likely to use health service. Therefore, it is important to take into account variables that could potentially produce spurious relationship between PAM and health service utilisation. The variables that are considered here include age, gender, ethnicity, deprivation (measured by the index of multiple deprivation) and existing long-term conditions. Patients with a missing value in any of the covariates are excluded from the analysis. The number of primary care contact and outpatient attendance are modelled using negative binomial regression. Hospital admission and A&E attendance are less frequent so are coded as binary variables and therefore modelled using logistic regression.

2.4.1 Primary care

Figure 2.13 shows the predicted number of primary care contact across PAM scores based on the regression model controlling for age, gender, ethnicity, deprivation and long-term conditions. We see that the number of contacts decreases as PAM scores increases from 10 to 100, but the rate of decrease is higher for patients at higher levels.

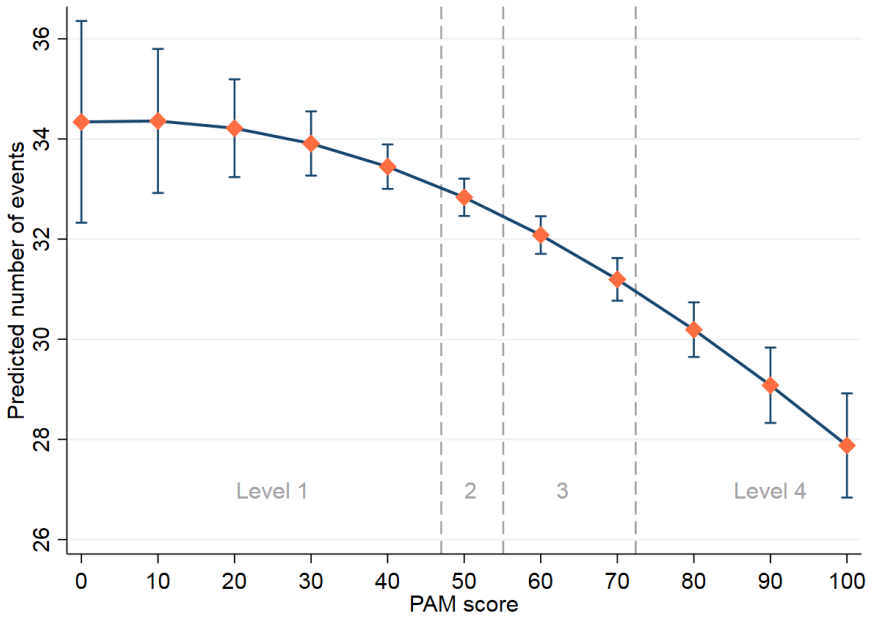


Figure 2.13 Predicted number of primary care contacts across PAM scores

As discussed in Section 1.2.3.1, primary care contacts can be broken down into GP and other primary contacts. These are modelled separately based on negative binomial regression models. Figure 2.13a shows the predicted number of GP events, which decreases as the PAM score increases in general. There is an upward trend at level 4 but negligible. In other words, patients with higher PAM scores visit their GP less often, especially for patients at the lowest

level. The relationship, however, is much smaller (or even reversed) for patients at higher levels. As shown in Figure 2.13b, the analysis of other primary care contacts tells a very different story. For most patients at level 1, those who with a higher PAM score use primary services more often than their relatively less active counterparts. The relationship is reversed for patients at level 2 or above. Patients with a higher score use the service less frequently.

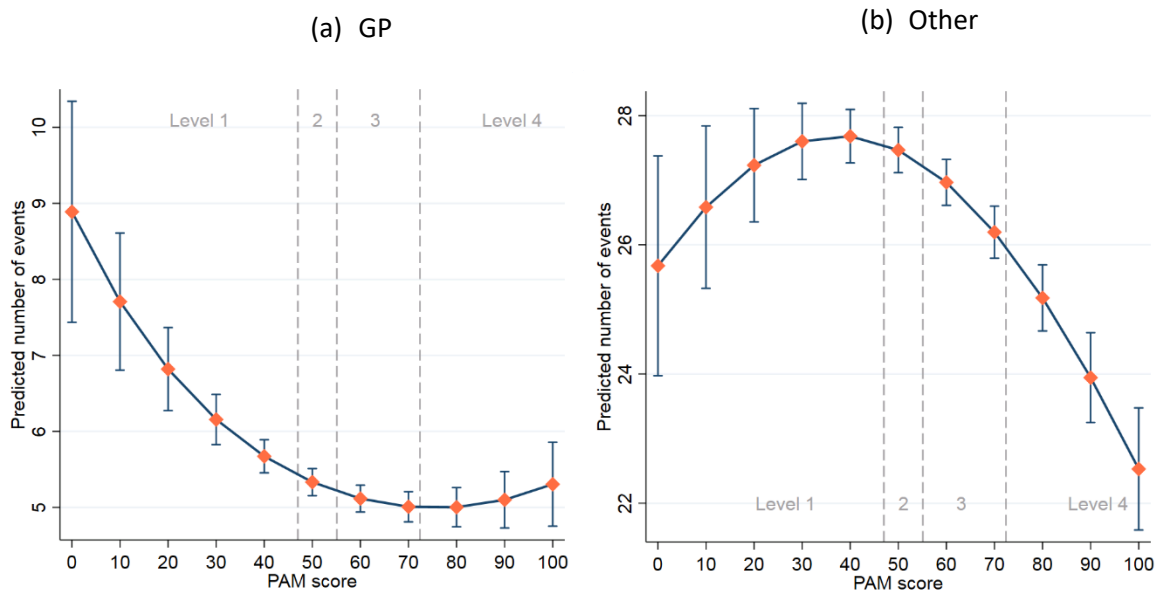


Figure 2.13 Predicted number of GP and other primary care contacts across PAM scores

2.4.2 Admitted patient care

Given only around a quarter of patients have a hospital admission within the one-year follow-up, hospital admission is treated as a binary variable and modelled using logistic regression.

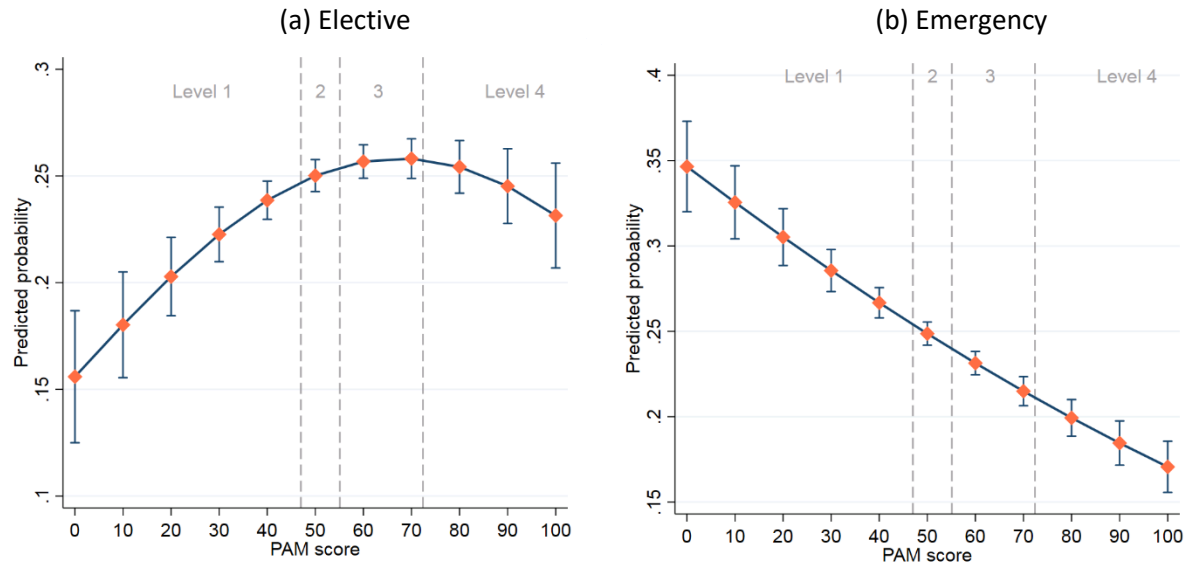


Figure 2.13 Predicted probability of elective and emergency admissions across PAM scores

Elective and emergency admissions are modelled separately. The predicted probabilities are shown in Figure 2.13.

For patients at level 1 to 3, those with higher PAM scores are more likely to have elective admissions. For patients at level 4, however, the predicted probability of elective admission is lower for patients with a higher PAM score (Figure 2.13a). Moving to emergency admissions, we see that the predicted probability decreases consistently across PAM scores and the rate is consistent across all levels. In other words, patients with a higher PAM score are less likely to have emergency admissions compared with their less active counterparts.

2.4.3 Outpatient

Figure 2.14a shows the predicted number of outpatient attendance. At level 1, patients with a higher score tend to have more outpatient visits. There is little difference at level 2, but at level 3 and 4, patients with a higher score tend to use outpatient services significantly less. As in Section 1.2.3.3, we also looked at the relationship between PAM and non-attendance of outpatient service. Not surprisingly, patients with a higher PAM score are less likely to miss their outpatient appointments. This relationship is consistent across all levels (Figure 2.14b).

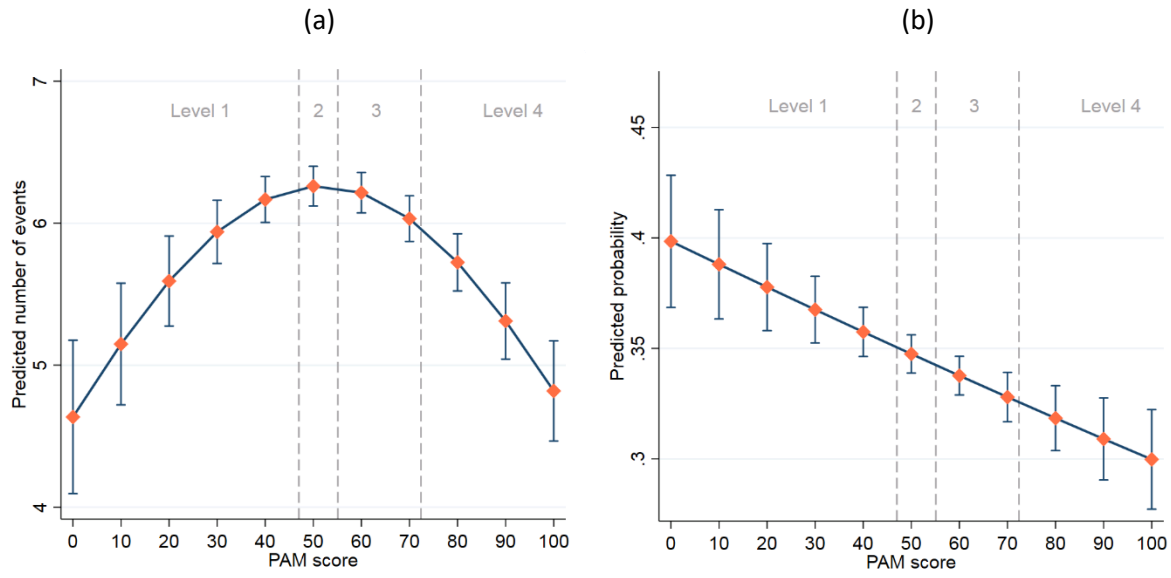


Figure 2.14 Predicted estimates of outpatients

2.4.4 A&E

Finally, we look at A&E attendance. As 58% of pateints did not use A&E service within the follow-up, it is treated as a binary variable and modelled using logistic regression. The predicted prabilities from the logistic regression model are presented in Figure 2.15. It is clear that patients with a higher PAM score are less likely to visit A&E, but the difference is rather small. The predicted probability decreases about 1.4% for each 10 point increase in PAM.

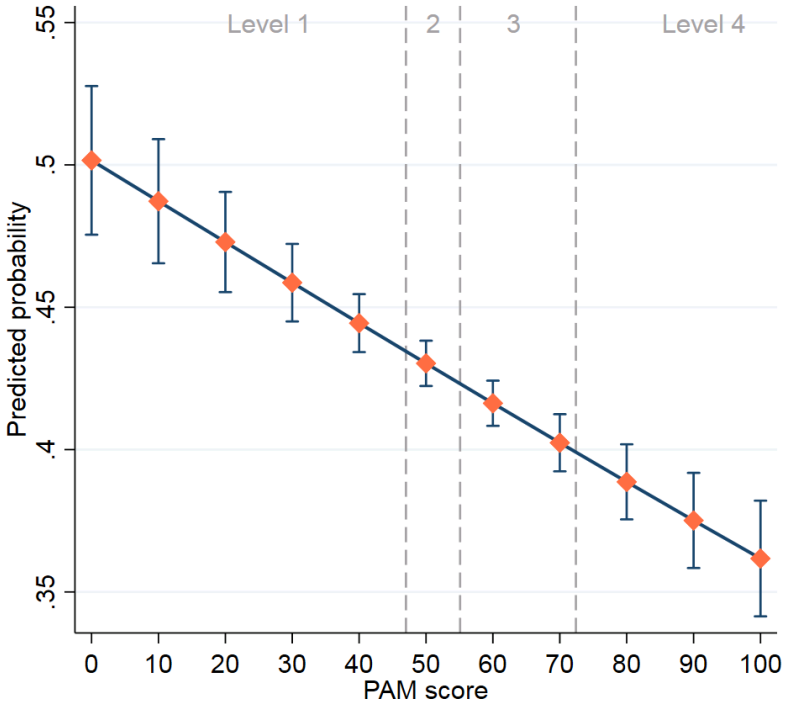


Figure 2.15 Predicted probability of A&E attendance

3. PAM: Analysis of Changes

3.1 Data

In this part of analysis, we focus on patients who had repeated PAMs, to get a grip of the impact of PAM changes on the changes in health service utilisation. As in the last section, we excluded any PAM that was assessed before 2016 and patients under 18 years of age. We excluded adjacent PAM assessments that were within 3 months that might be too short for a change to take place, stabilise and manifest in any outcomes. Further, we also excluded PAM assessments that were more than 1 year apart, with the main reason being that as the gap widened, PAM or outcome measures were more likely to be influenced by other factors, such as the natural process of aging or deterioration of conditions. Among the remaining patients, 85% of them had two PAMs. For patients who had more than two PAMs (15%), the first two assessments were used to simply the analysis. There were 2,518 patients each providing two repeated measures.

For the outcome, we compared health service utilisation in 6 months *before* the first PAM assessment with health service utilisation in 6 months *after* the second PAM assessment. This was to avoid potential 'contamination' because it was impossible to know when exactly patient activation started to change between two PAM assessments. In this section, we focus on primary care service utilisation as there was a lack of across time variation in other outcome measures. The study design is illustrated in Figure 3.1.

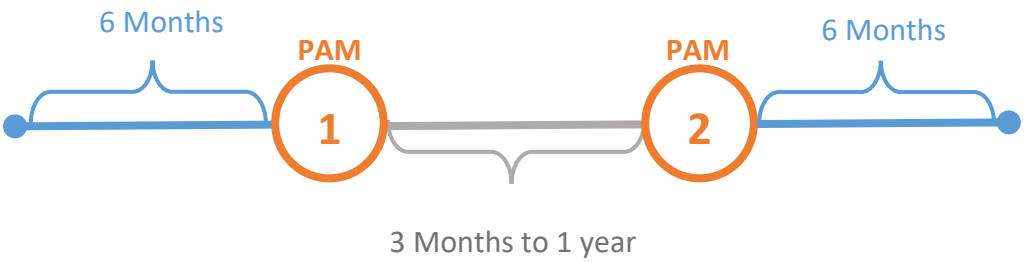


Figure 3.1 Illustration of the data design

3.2 Changes in PAM

Figure 3.2 shows the distribution of PAM changes for all patients and by PAM levels at the baseline. Among all patients (N=2,518), 23% of them had a PAM score that was at least 5 points lower at the second assessment. About 32% of them increased their PAM scores by at least 5 points. The remaining 45% of patients had little change in their PAM scores. Not surprisingly, the distribution of PAM changes differed across PAM levels (at the baseline). For patients at level 1 for the first assessment (N=873), 47% of them increased their PAM scores by at least 5 points. Only 8% of them had a substantial decrease (≥ 5 points) by the second assessment. At level 2, 33% of patients had a substantial increase and 13% decrease (N=652).

Here we combined level 3 and 4 due to the small sample size in each group. For patients at level 3 or 4 (N=993), only 19% of them had a substantial higher PAM score at the second assessment; whereas 43% of them had a PAM score that was substantially lower. This is the opposite to level-1 patients, which was likely due to the ceiling effect where there was little room for improvement as PAM scores approaching to the high end.

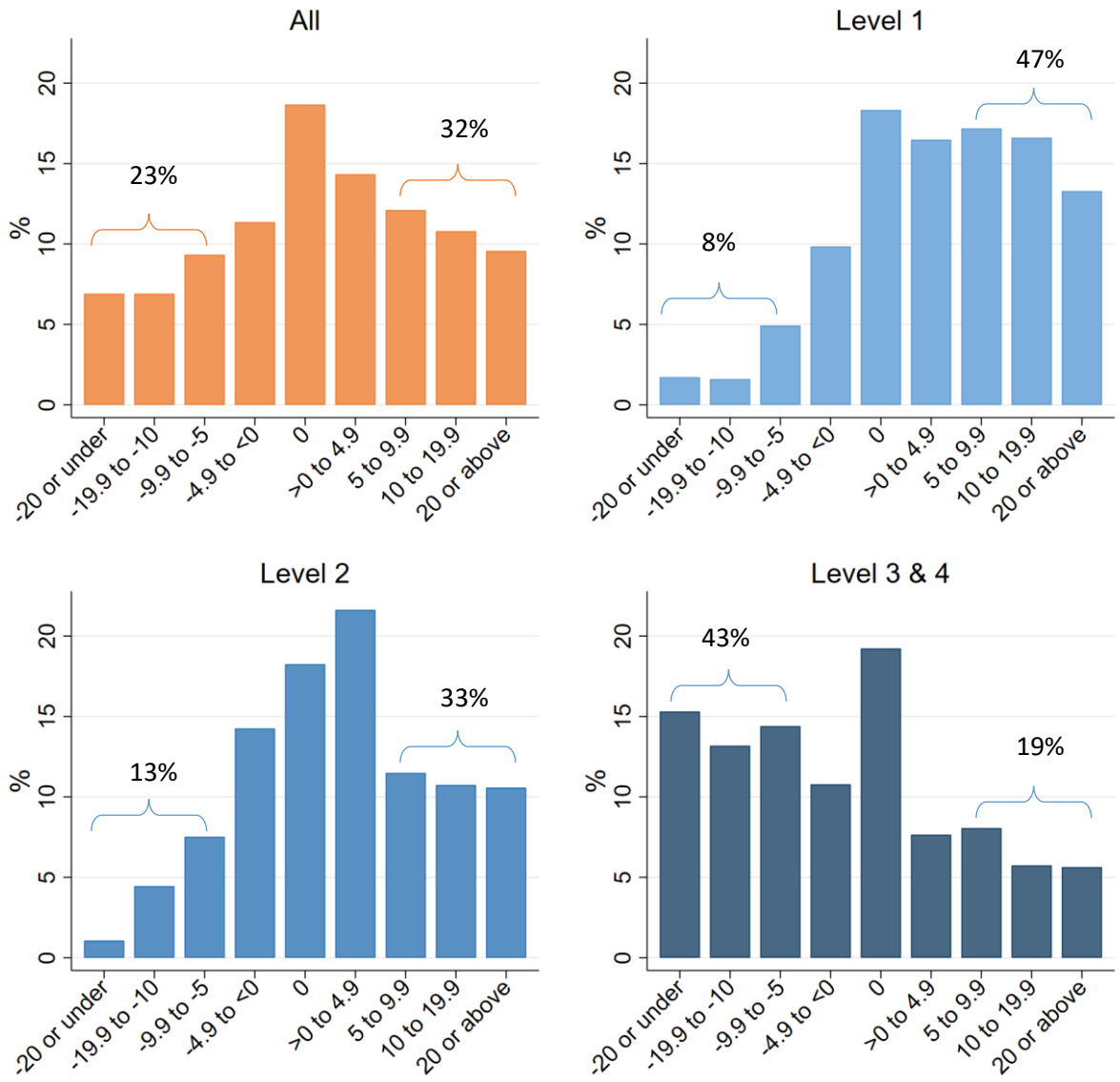


Figure 3.2 Distribution of PAM changes by PAM levels at baseline

3.3 Changes in PAM and GP visits

In section 2.4.1, we saw that the relationship between PAM scores and primary care service utilisation was non-linear. Also, as shown in section 3.2, the distribution of PAM changes varied across different levels. Therefore, we examined the association between PAM changes and the changes in number of GP visits by PAM levels (at the baseline). The data were analysed using first-difference regression. The results are presented in Figure 3.3.

We dichotomised the changes in PAM scores into five categories, using the no change group as the reference where the estimated coefficient was 0. The dots in Figure 3.3 show the estimated coefficients and the vertical lines show the range where we are 95% confident that the true value falls within (aka 95% confidence intervals). If the 95% confidence intervals contain the value of 0, this is an indication that the estimated coefficient is not statistically significant. That means the data do not support that there is an association. In the model including all patients, there was little evidence that the changes in PAM was associated with the changes in GP visits. However, for level-1 patients, a substantial increase in PAM (≥ 5) was associated with a significant increase in the number of GP visits. For patients with a higher PAM level (3 or 4), an increase by 5+ points was associated with a decrease in the number of GP visits. There was no evidence that decrease in PAM was associated with the changes in GP visits.

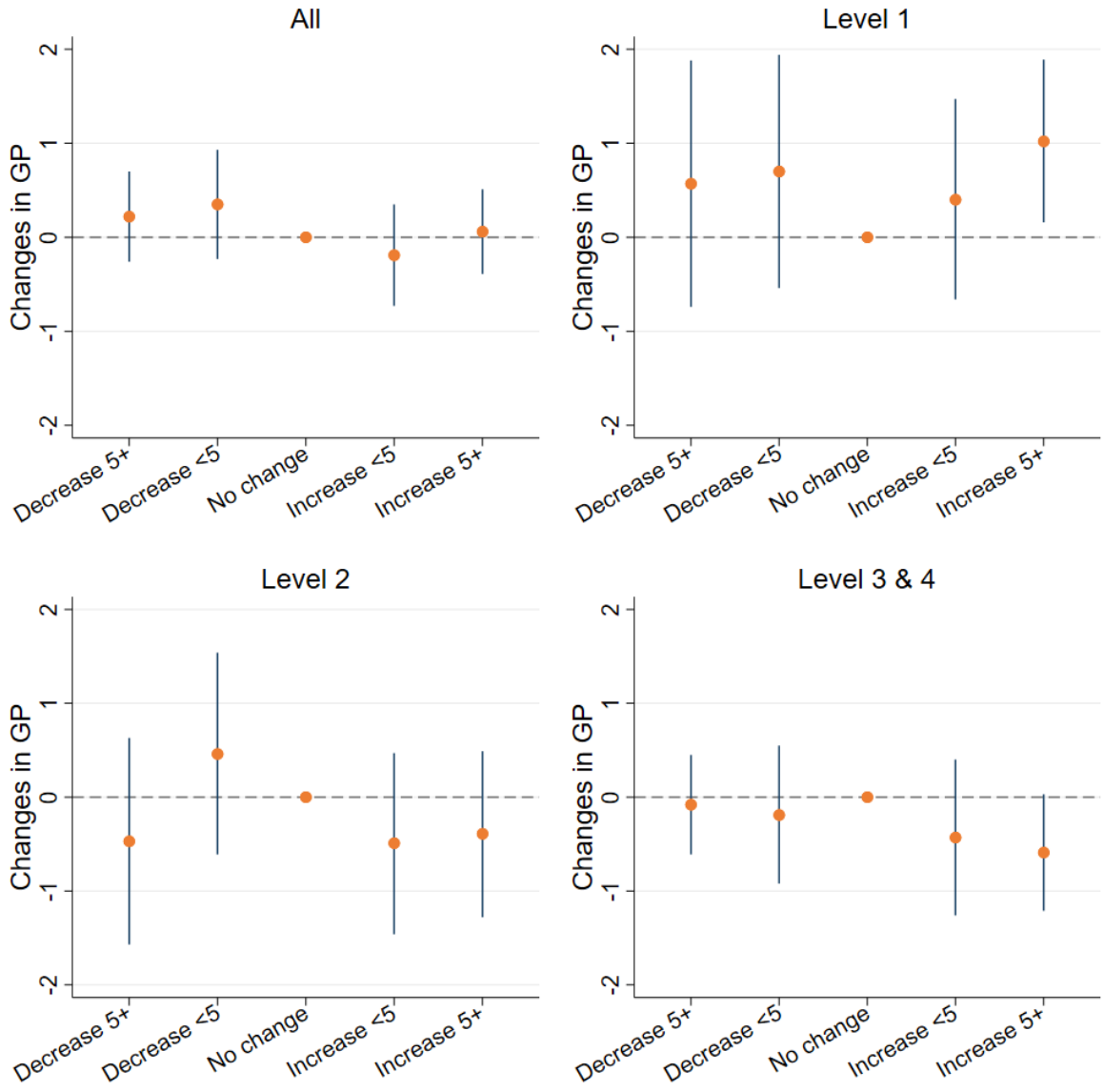


Figure 3.3 Relationship between the changes in PAM and number of GP visits

3.4 Changes in PAM and other primary care service utilisation

In this section, we look at other non-GP primary care service utilisation using the same method described in the last section. As shown in Figure 3.4, the estimated coefficients were not statistically different from 0 either in the overall sample or for patients with different PAM levels. In other words, we found no evidence that the changes in PAM was associated with the changes in other primary care service utilisation in this particular analysis. This is not consistent with the cross-sectional results in section 2.4.1. One possible explanation is that patients with two PAM assessments were different from those with only one assessment. But this remains to be explore further, especially when more data become available.

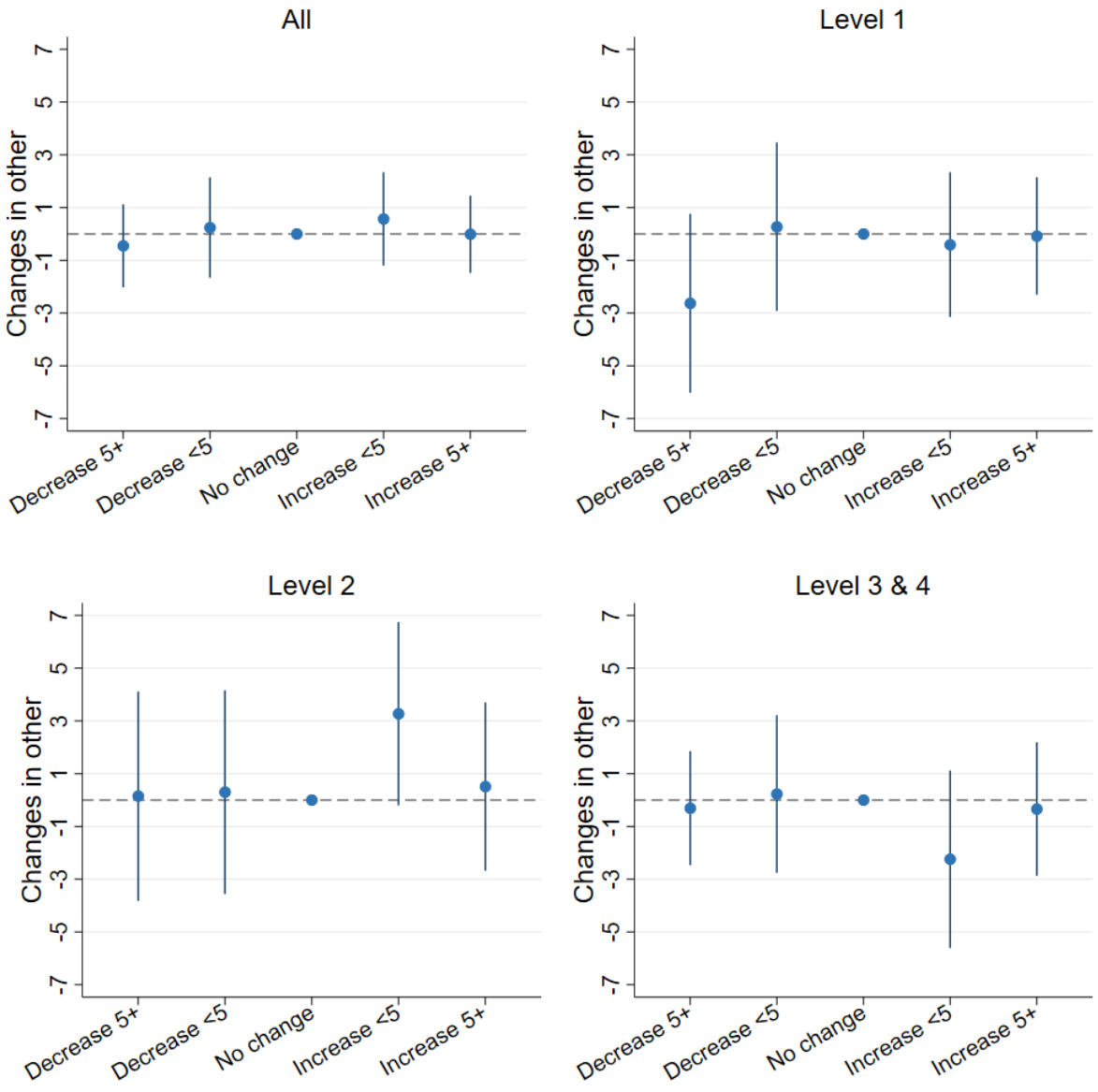


Figure 3.4 Relationship between changes in PAM and other primary care utilisation

Part II

Social Prescribing

4. Social Prescribing

4.1 Introduction

Social prescribing is a non-medical intervention that links patients in primary care with sources of support within the community. It is defined by the Social Prescribing Network[13] as "a means of enabling GPs and other frontline healthcare professionals to refer patients to a link worker - to provide them with a face to face conversation during which they can learn about the possibilities and design their own personalised solutions, i.e. 'co-produce' their 'social prescription'- so that people with social, emotional or practical needs are empowered to find solutions which will improve their health and wellbeing, often using services provided by the voluntary and community sector".

4.2 Data

Social prescribing records were derived from primary care GP events data between 01/01/2019 and 29/02/2020 in North West London, using the following Read Codes (version 2):

- Social prescribing offered (9NSE.)
- Social prescribing declined (8IEp.)
- Social prescribing for mental health (8BAf.)
- Referral to social prescribing service (8T09.)
- Signposting to social prescribing service (N/A)

In contrast to patients who were offered social prescribing, we constructed a comparison group which was a random sample (1%) of patients (aged 18+) who used primary care service between 01/01/2019 and 29/02/2020 without being offered social prescribing. In total, there were 5,972 patients who had at least one social prescribing record (regardless of decline or acceptance) and a comparison group consisted of 15,322 people.

4.3 Service offering

Figure 4.1a compares the age profile of people who were and were not offered social prescribing (SP) services. A striking difference was observed between these two groups. The percentage of older people, in particular those aged 70+ was disproportionally higher in the SP group. By contrast, only a small fraction of younger people were offered SP services.

Among patients who were offered SP, 59% were women in contrast to 53% in the no-SP group. As shown in Figure 4.1b, the ethnicity profile was more balanced between the SP and no-SP groups. However, there was a lower percentage of white (33% vs. 38%) and Asian (24% vs. 31%) patients among people who were offered SP and a higher percentage of patients from other ethnic backgrounds (21% vs. 13%).

Figure 4.1c shows the makeup of deprivation. Amongst those offered SP, there was a higher percentage of people from the most deprived areas (IMD 1-2) and a much lower percentage of people from the least deprived areas (IMD 9-10).

Figure 4.1d shows a substantial discrepancy across boroughs in North West London. This suggests that there might be differences in the implementation and delivery of social prescribing. It is important to note, however, this could also be due to differences in the adoption of the social prescribing codes listed above.

Figure 4.1e suggests that patients with long-term conditions were more likely to be offered SP, so were frequent primary care users (Figure 4.1f).

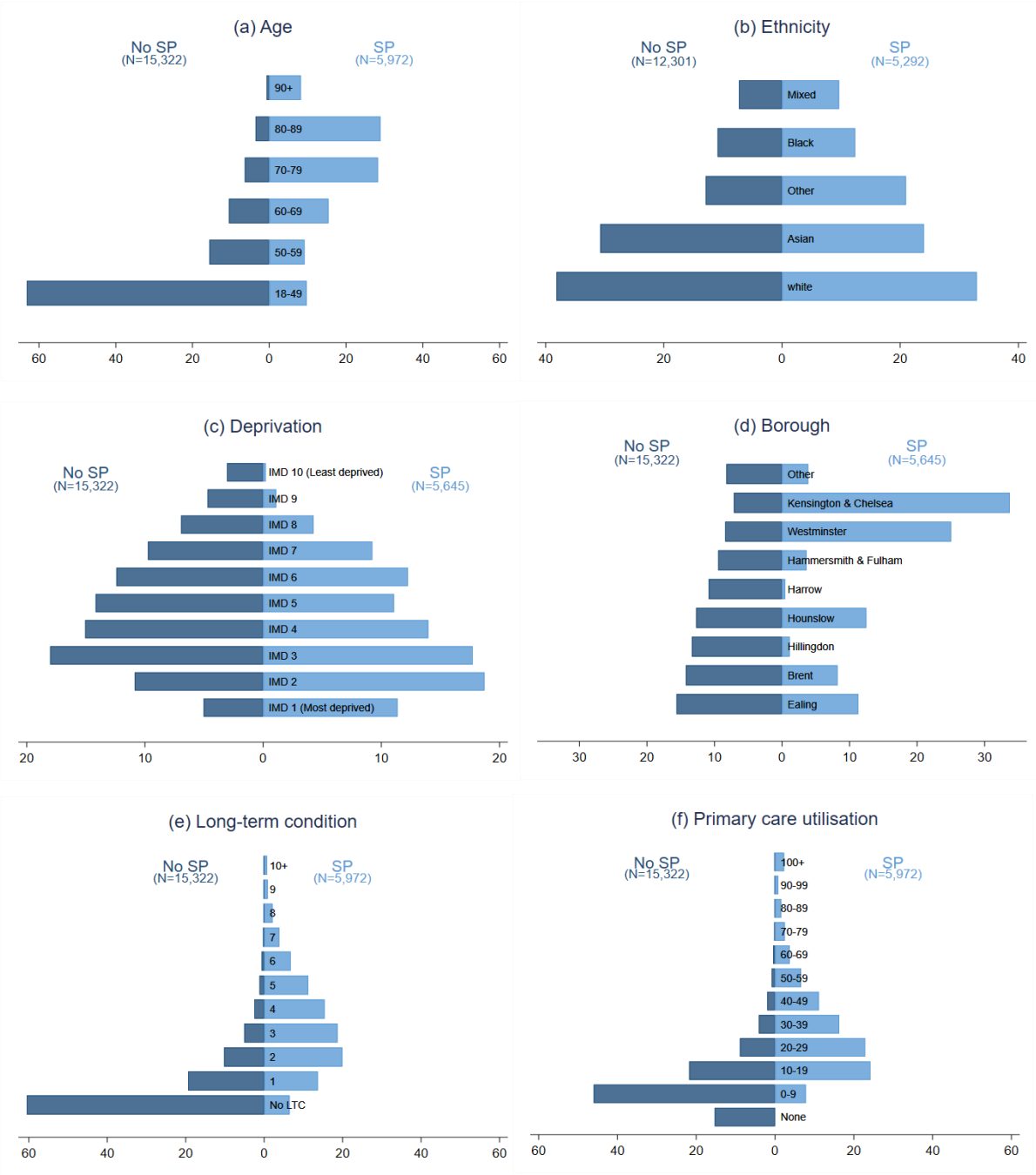


Figure 4.1 Social prescribing service offering by demographic and health characteristics

4.4 Service acceptance

Among 5,972 patients who had a social prescribing (SP) record, 57% were coded as 'social prescribing offered', 17% as "referred" and 26% as "declined". The coding of "offered" is ambiguous as it does not say whether patients were simply told about SP or actually took up the offer and were therefore "referred". Nonetheless, it is important to ascertain if there are differences in the people who accept and reject SP referrals. So this section examines what demographic and health characteristics are related service declining by comparing people who declined with those who were referred. Patients who were coded as being offered were excluded due to ambiguity.

Among patients who declined SP service, about 57% were women, in contrast to 65% among those who were referred. As shown in Figure 4.2a, there was a lower percentage of younger people (under 60), and a higher percentage of patients in their 70s and 80s among people who declined. The figure for ethnicity was almost symmetrical, suggesting ethnicity had little influence on whether people decline (Figure 4.2b).

Figure 4.2c compares the deprivation makeup between patients who declined and who were referred. Generally speaking, the pattern of deprivation was similar between the two groups, but a higher decline rate was observed for patients from some areas (IMD 5 and 9), which were some of the more deprived areas. However, the pattern of declination appeared to vary a lot across boroughs (Figure 4.2d) so might be more to do with the SP service within each borough than about area deprivation itself.

Figure 4.2e suggests that there was little difference in number of long-term conditions between patients who declined and who were referred. However, less frequent primary care users (<30) had a higher decline rate; whilst frequent service users had a lower decline rate (Figure 4.3f).

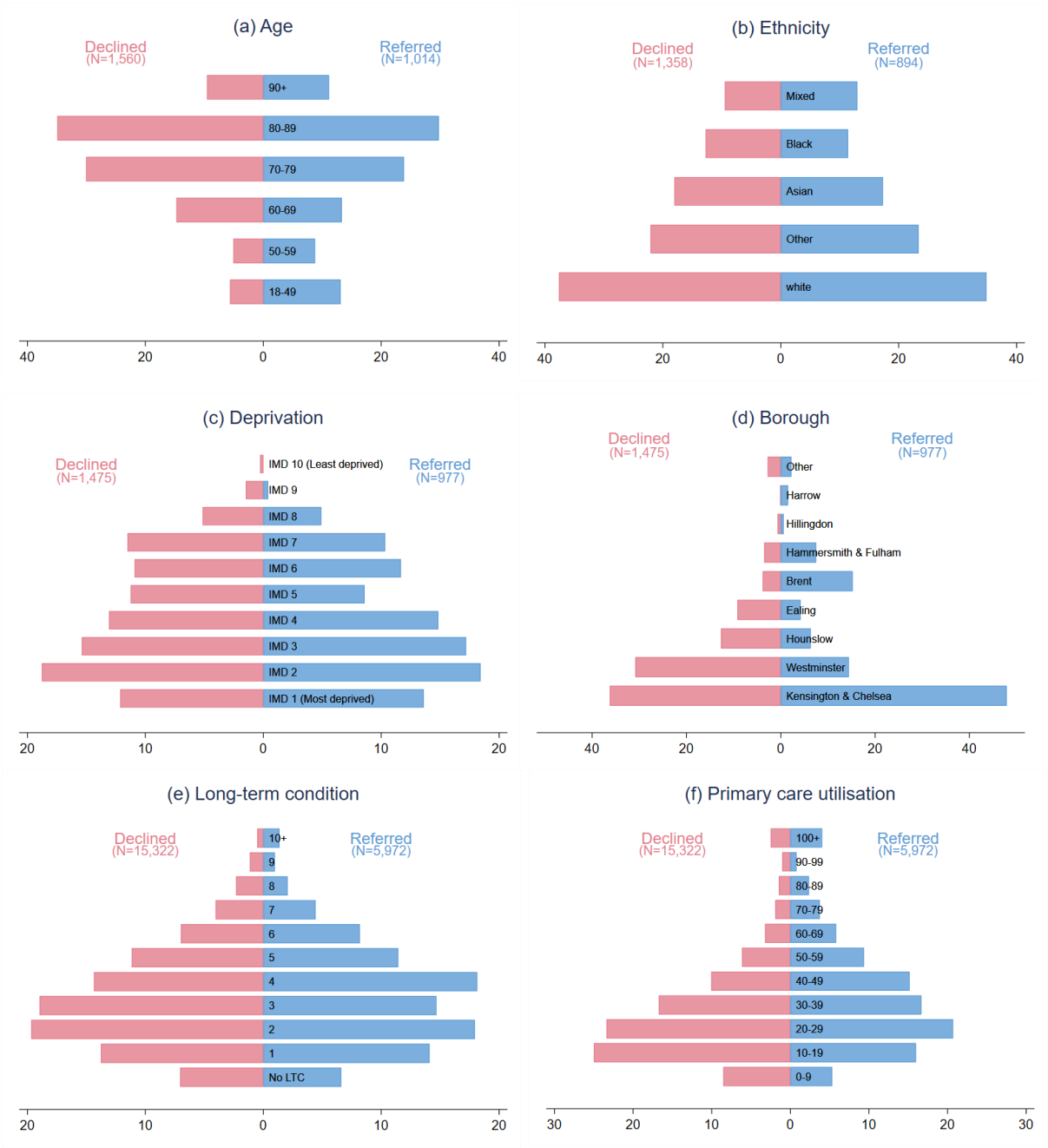


Figure 4.2 Social prescribing declining by demographic and health characteristics

5. Conclusion

This report looks at both Patient Activation Measure (PAM) and social prescribing using administrative data from North West London. The cross-sectional analyses have provided strong evidence linking PAM and health care service utilisations, including primary care (GP and non-GP visits), admitted patient care (elective and emergency admissions), outpatient and A&E attendances. The relationship differs depending on which specific service we look at. As PAM scores increase (patients who are more active in managing their health), the use of GP, emergency admitted patient care and A&E decreases. There is also evidence that patients with a higher PAM are less likely to miss outpatient appointments. However, the relationship is non-linear for non-GP primary care service, outpatient care and elective hospital admissions. The service utilisation increases as PAM increases for patients with a lower PAM level, but decreases (as PAM increases) for patients with a higher PAM level. It is possible that for patients with a lower PAM level, an increased use in these services is a reflection of better health self-management which may result in a reduction in health care utilisation in a long run. All in all, these findings have highlighted the importance of looking at different types of health care services separately and making a distinction between patients with different PAM levels.

In addition to the cross-sectional analyses, we have also examined how the changes in PAM are related the changes in health care service utilisation using primary care as an example. There is some evidence that a substantial increase (≥5) in PAM is associated with an increase in GP visits for patients at the lowest PAM level, but with a decrease in GP visits for patients with higher PAM levels (level 3 or 4) at the baseline. However, no evidence is found for non-GP primary care utilisation. It's important to note that this longitudinal analysis is based on a small number of patients (total N=2,518). Moreover, it is also possible that patients with repeated PAM measures are systematically different from those with only one assessment. Therefore, this remains to be explored further.

The analyses of social prescribing (SP) show that people from older age groups (in particular, those aged 70+), people from deprived areas, those with long-term conditions and frequent primary care service users are more likely to be offered SP. There is little evidence that SP offering is related to gender or ethnicity. When comparing patients who accepted SP with those who declined, we find that acceptance/decline is related to age, gender and primary care utilisation to some extent. However, generally speaking, these two groups (decline vs. acceptance) are more or less balanced in terms of the characteristics that we have looked at.

In our analysis of SP, we have identified two issues which could be improved in future. First, the most commonly used SP code is 'social prescribing offered (9NSE.)' in the data. Without further information, this code per se is ambiguous as it is unclear if patients are simply told about SP or actually take up the offer and are therefore "referred". It will offer more clarity if this code is used consistently in combination with the 'social prescribing declined (8IEp.)' or 'referral to social prescribing service (8T09.)' codes. It will also be very valuable to know what types of SP services which patients are offered or referred to for evaluation purpose. Second,

we find marked discrepancies across boroughs in SP offering and in acceptance/decline. However, it is hard to say if this is due to the difference in service implementation or simply the difference in using SP codes. We have not inspected the differences across different GP practices in this analysis, but we imagine there would also be a lot of discrepancies. To ensure comparability, it is also important to promote standardisation in SP coding practice in future.

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