Equity of a government subsidised exercise referral scheme: a population study

ABSTRACT

Background: Health inequities could increase if utilisation of physical activity interventions is lower among socioeconomically disadvantaged groups. We examined associations between area level socioeconomic disadvantage and utilisation of Australian government-subsidised, general practitioner (GP)-referred, accredited exercise physiologist (AEPs) services.

Methods: We conducted a cross-sectional analysis of Australian Medical Benefits Scheme (MBS) data (N = 228,771 AEP services) for the 2015-2016 financial year and aggregated publicly available data from several sources. Spearman's correlations examined associations between utilisation of AEP services and area-level socioeconomic disadvantage, indicated by Index of Relative Socioeconomic Disadvantage (IRSD) decile scores. Lower IRSD scores indicate greater levels of socioeconomic disadvantage.

Results: Significant correlations between IRSD score and study variables were as follows: Out-of-pocket expenses/service (rs = 0.52); number of patients/AEP provider (rs = -0.42); number of patients/1000 population (rs = -0.24); AEP services/ 1000 population (rs = -0.18); average services/patient (rs = 0.24); and AEP provider/1000 population (rs =0.14)..

Conclusion: Patients living in areas of greater disadvantage utilised government-subsidised, GP-referred AEP services at a higher rate and paid lower out-of-pocket fees than those living in more affluent areas. Thus, AEP services are equitably distributed, from a utilisation perspective, and acceptable to patients living in areas of disadvantage. However, the higher caseloads and lower fees that characterise AEP services in areas of greater disadvantage may result in shorter consultation times. Further research on exercise referral schemes is warranted, particularly whether socioeconomic disadvantage is associated with adherence to exercise sessions and health outcomes.

Keywords: physical activity; access; health care; referral; exercise physiologist; socioeconomic disadvantage; general practitioner

INTRODUCTION

Managing chronic disease and preventing further illness is an increasing priority in health care. In 2014–15, 50% of Australians reported having at least one chronic disease (Australian Institute of Health and Welfare, 2016) and chronic disease is the leading cause of illness, disability and death in Australia (Australian Institute of Health and Welfare, 2011). Strong evidence supports the benefits of physical activity for both the prevention and management of several chronic diseases (e.g. cardiovascular disease, diabetes, colon and breast cancer) (Andersen et al., 2010; Hayashino et al., 2012; Hernandez-Hernandez & Diaz-Gonzalez, 2017; Olney et al., 2006; Rogers et al., 2015). In Australia and other developed countries, chronic disease rates and physical activity levels are socially distributed and vary by socioeconomic position; people who experience greater socioeconomic disadvantage are less likely to meet recommended levels of physical activity and more likely to have chronic disease (Australian Institute of Health and Welfare, 2011, 2014a, b; J. A. Bennie et al., 2016a; Shaw et al., 2014). It is important, therefore from a chronic disease prevention and equity perspective, that physical activity interventions are acceptable and reach people from socioeconomically disadvantaged groups. It is likely that health inequalities will increase if physical activity interventions are more successful among those of greater affluence (Shaw et al., 2014; Welch et al., 2013).

Health care settings are increasingly recognised as important for the promotion of physical activity (Greulich et al., 2014; Morris et al., 2014; Qiu et al., 2012; Short et al., 2015).Internationally, research on exercise referral schemes, largely from the UK, which involve health care professional referrals to exercise specialists, has gained increasing attention (Murphy et al., 2012; Pavey et al., 2011). (Britt et al., 2016). Studies have examined the effectiveness of exercise referral schemes, and show that they result in a small, but

significant, increase in the number of inactive adults who become moderately active (Hamlin et al., 2016). However, few, and none from Australia, have examined whether uptake is equitably distributed, and hence reaches those who are socioeconomically disadvantaged (Hämäläinen et al., 2016). The limited number of studies that have examined whether attendance at exercise sessions following referral from a health care professional is associated with socioeconomic position have reported mixed results. One study showed that people who experienced greater levels of disadvantage were less likely to take up referrals and utilise exercise sessions (Gidlow et al., 2007), while others have shown that socioeconomic disadvantage was not associated with utilisation (Harrison et al., 2005; Sowden et al., 2008).

In 2006, the Australian government introduced Chronic Disease Management Plans (CDMPs), funded through Medicare. Medicare is the Australian Government funded health insurance scheme that provides free or subsidised health care services to Australians and was designed to ensure equity in health care provision. CDMPs enable general practitioners (GPs) to plan and coordinate multidisciplinary health care for patients with chronic conditions such as cancer, cardiovascular disease, diabetes, musculoskeletal conditions and stroke. Under this scheme, GPs can develop team care arrangements, which require the GP to collaborate with at least two other health professionals. Through this team care arrangement GPs can refer patients to allied health professionals, including Accredited Exercise Physiologists (AEPs), and patients can claim a rebate for a maximum of five visits per calendar year. The five visits are the total across all allied health professionals and can be provided by a single allied health professional or shared across different allied health professionals (Department of Health, 2014). AEPs are four-year university degree qualified health professionals specialising in the delivery of exercise for the prevention and management of chronic diseases and injuries. Given that 85% of Australians visit a GP at least once in any given year (Britt et al., 2016),

GP referral to AEPs has the potential for substantial population reach. However, to the authors' knowledge, no studies have examined the extent to which patients from different socioeconomic groups utilise GP-referred AEP services through CDMPs.

Examination of the key factors that influence utilisation and impact, such as out-of-pocket expenses and health care professional caseloads (Johar et al., 2017), are also of interest when assessing issues relating to equity. Evidence from the US (Gruber, 2006) and Australia (Achat et al., 2010) demonstrates that the introduction of any cost or co-payment for health services decreases access for those who experience socioeconomic disadvantage. Examination of the number of health care professionals and their case load, according to the socioeconomic status of areas, is also important because previous studies show that health professionals are more concentrated in more affluent areas (Jason A. Bennie et al., 2016b; Kurdyak et al., 2014) which might reduce access to people living in socioeconomically disadvantaged areas. Furthermore, higher caseloads may mean that health care professionals have reduced consultation time and this might reduce the quality of care received (Johar et al., 2014).

In this study, we examined the utilisation of Australian government subsidised, GP-referred AEP services. The aims of the study were to examine associations between area level socioeconomic disadvantage and: (i) average out-of-pocket expense per service; (ii) average number of services per patient; (iii) average number of patients per provider; (iv) number of patients per 1,000 of population; (v) number of providers per 1,000 of population, and (vi) number of services per 1,000 of population.

METHODS

Study design

We conducted a cross-sectional analysis of Medicare Benefit Schedule (MBS) data for the 2015-2016 financial year and aggregated publicly available data from a number of sources to address our research aims.

Data Collection

Medicare item reports for AEP services (item 10953), were downloaded from the Department of Human Services website (http://medicarestatistics.humanservices.gov.au/statistics/mbs_item.jsp). MBS data on AEP services were downloaded from the Primary Health Network website (http://www.health.gov.au/internet/main/publishing.nsf/Content/PHN-MBS_Data). These data are aggregated at the Statistical Area 3 (SA3) level of the provider address. The data accessed included SA3 code, the number of providers, number of patients, total number of services, and total out-of-pocket expenses. SA3 divides Australia into 333 spatial units with populations typically between 30,000–130,000. In aggregate, they cover the whole of Australia without gaps or overlaps, and do not cross state/territory borders (Australian Bureau of Statistics, 2010a). All data are reported in Australian dollars.

MBS data are subject to Australian government data suppression protocols to ensure confidentiality of service users and providers. Data are suppressed if one of the following two conditions are met: (i) the number of services, patients or providers in the underlying data is less than 6, or (ii) if one health care professional provided more than 85% of services or two health care professionals provided more than 90% of services. The latter rule sometimes results in suppression of relatively large service volumes. As such, although listed in the

dataset, not all SA3 regions included data on AEP providers and services and we were not able to include these in our analyses. Furthermore, not all SA3s were listed in the dataset, and were therefore assumed to have no services provided/reported for the financial year. For the 2015-2016 financial year, 67.9% (226/333) of SA3s were represented with AEP data. Of the remaining 107 SA3s, 21.9% (73/333) had suppressed data and 10.2% (34/333) were not listed in the dataset with presumably no AEP services for that year.

To assess relative levels of socioeconomic disadvantage, we used the Australian Bureau of Statistics (ABS) Socioeconomic Indexes for Areas (SEIFA) Index of Relative Socioeconomic Disadvantage (IRSD)(Australian Bureau of Statistics, 2011). An IRSD score indicates the collective socioeconomic characteristics (e.g. education, employment status, marital status, vehicle ownership, and income) of the people living in an area with a lower score indicating greater disadvantage [14]. As an IRSD score at the SA3 level is not available from the ABS, a representative score was derived using IRSD data available at the SA1 level (data downloaded from: http://www.abs.gov.au/ausstats/abs@.nsf/DetailsPage/2033.0.55.0012011?OpenDocument). SA1s are smaller geographical areas that fit within and do not cross SA3 boundaries. To obtain an average IRSD score at the SA3 level, a weighted average was calculated based on the decile score distribution of SA1s within an SA3. The weighted average was rounded to the nearest integer to obtain an "average IRSD decile" score between 1 and 10 (i.e. greatest-to-least disadvantaged).

To estimate the number of patients, services and providers per 1,000 population in a given SA3, the estimated SA3 resident populations were used. Estimated resident population for

2016 was downloaded from the ABS website

(http://stat.abs.gov.au/Index.aspx?DataSetCode=ABS_ERP_ASGS#)

We examined: (i) average out-of-pocket expense per service (fees charged - benefits paid/services); (ii) average number of services per patient (number of services/number of patients): (iii) average number of patients per provider (number of patients/number of providers); (iv) number of patients per 1,000 of population; and (v) number of providers per 1,000 of population, and (vi) number of services per 1,000 of population. These variables were chosen because these data are publically available and provide insight into the utilisation of AEP services. For the last two variables, the number of patients and providers were standardised against 1,000 residents to control for differences in SA3 population size.

Statistical analysis

The main analysis was based on the 226 SA3 regions that had MBS AEP data. The 34 regions with no data (i.e. no services) and the 73 which had suppressed data were examined in a missing data analysis - see below. Data were analysed and graphed using SPSS (v24). IRSD scores and all MBS AEP-related variables were assessed for normality and extreme outliers. We identified few outliers,defined as data-points outside the interquartile range by 3 or more magnitudes. Out of 226 possible data points per variable, ≤ 3 data points (≤1.3%) were identified for the following variables: out-of-pocket expense, patients per provider and providers per 1000 residents. In a sensitivity analysis, we ran analyses with and without outliers and found negligible differences in the results, so outliers were retained in the dataset.

To address our aim of examining associations between socioeconomic disadvantage (IRSD) and various measures of AEP utilisation, correlations between these factors were conducted. Due to the non-normal and often highly heteroscedastic spread of data, we utilised Spearman's correlations. Strength of association was based on the following rho (r_s) cut-points: <0.3 designated as 'small', 0.3<0.5 as 'medium' and ≥0.5 as 'large' (Cohen, 1988). Significance was set at $p < 0.05$.

Missing data analysis

As discussed, for the 333 SA3 regions, 34 had no data listed and 73 had suppressed data. Therefore, a missing data analysis was conducted to check whether these SA3 regions were socioeconomically different from those with available data as indicated by IRSD score and Accessibility/Remoteness Index of Australia (ARIA+ 2011) values (https://www.adelaide.edu.au/hugo-centre/spatial_data/aria/).

RESULTS

Number of AEP services and benefits claimed

In 2015-2016, 242,690 AEP services were accessed Australia-wide; the total amount of benefits claimed was $12,936,209. Females (n= 149,046; 61.4%) accessed a greater number of AEP services than males. Over half all services (59%) were accessed by adults 55+ years (Table 1).

Table 1 here

Data for our main analysis was based on MBS AEP data matched to SA3 regions which for 2015-2016 included 226 SA3s with available data (see missing data analysis below). In total,

108,912 patients utilised AEP services representing 0.54% of the population within the 226 SA3 regions. Table 2 shows the summary characteristics with respect to AEP services for the 226 SA3 regions.

Table 2 here

SEIFA characteristics of SA3 regions

The average IRSD decile scores for the 226 SA3s with MBS AEP data ranged from 2-10 (most to least disadvantaged) with a mean (SD) of 5.7 (1.8). The most common IRSD decile designation was 5 representing 45 SA3s (19.9%). For both deciles 2 and 10, only 2 SA3 regions (0.009%) were represented – as such these deciles were omitted from further relational analyses due to such low representation and therefore lack of certainty regarding group averages and potential high variance.

Regional AEP utilisation and relationship to SEIFA

Figure 1 shows AEP utilisation variables plotted against average IRSD decile score at the SA3 level. Out-of-pocket expenses/service showed a strong positive correlation with IRSD score ($r_s = 0.52$). For example, out-of-pocket expenses were lowest in SA3s with average decile score of 3 ($0.71/service) and highest in SA3s with average decile score of 9 ($13.59/service), representing ~20-fold increase. In contrast, the number of patients per provider showed a moderately negative association with IRSD score ($r_s = -0.42$). On average, the number of patients per provider were higher in SA3s with lower-mid deciles scores (e.g. deciles scores 3-6) and markedly lower in the SA3s with the highest decile scores (e.g. 7-9). For example, in decile score 3 the average number of patients/provider was 71.6 compared to 41.4 for decile score 9.

When examining the number of patients/1000 population, a weak but significant trend was observed for declining numbers as the average IRSD decile increases (r_s = -0.2) - for example 7.2 patients/1000 for decile score 4 compared to 3.9 patients/1000 for decile score 9 - although decile 3 somewhat opposed this trend (5.6 patients/1000). The services per 1000 population showed a similar pattern to patients per/1000 with the number of services generally declining as decile scores increase (r_s = -0.18). A weak but significant positive association was also observed for the number of services per patient (r_s = 0.2), for example, 2.0 services/patient in decile score 3 compared to 2.3 in decile score 9. There was also a statistically significant pattern observed for the number of providers per 1000 population (r_s = 0.14) such that as the average IRSD decile increases so does the number of AEP providers. For example, there were 0.08 providers per 1000 population in decile score 3 compared to 0.13 in decile score 9.

Figure 1 here

Missing data analysis

Thirty-four SA3 regions (10.2%) had absent data, and presumably no AEP services for 2015-2016. It was expected that AEP services are generally not provided in remote, sparsely populated areas, and thus the ARIA characteristics of the 34 SA3s was examined. The average ARIA score for these 34 SA3s was 7.7 representing "remote" areas in Australia (Supplementary Table 1). The average IRSD decile score for these SA3s was lower (4.3 ± 1.6) compared to the 226 SA3 regions in the main analysis (5.7 ± 1.8). The differing area characteristics indicate that the main findings are generalizable to non-remote areas in Australia.

Suppressed data from 73 SA3 regions: Based on available MBS data from the 226 SA3 regions, 228,771 AEP services were accessed representing 94.3% of the total AEP services for 2015-2016. The average IRSD decile score for the SA3s with suppressed data (5.0 ± 1.6) was similar to the 226 SA3 in the main analysis. This suggests that the suppressed data appeared to come from regions having a similar spread of characteristics as the main sample, and therefore the results from the main study are generalizable to these regions.

DISCUSSION

Socioeconomic disadvantage was associated with utilisation of AEP services such that patients from areas of greater socioeconomic disadvantage accessed AEP services at a higher rate than those from areas of less disadvantage. Although not directly comparable to our data, which only looked at utilisation, the findings of other studies examining whether the uptake of exercise referral schemes differed according to socioeconomic disadvantage are equivocal (Gidlow et al., 2007; Harrison et al., 2005; Sowden et al., 2008). Given that rates of chronic disease are likely to be higher in areas of greater disadvantage (Australian Institute of Health and Welfare, 2011) and levels of physical activity often lower (Australian Institute of Health and Welfare, 2014a; J. A. Bennie et al., 2016a), our findings suggest that AEP services are theoretically reaching those who need them the most.

We conducted exploratory post hoc analyses to further examine the association between utilisation of AEP services, level of chronic disease and socioeconomic disadvantage. After controlling for the number of team care arrangements and GP management plans, the association between the number of patients/1000 population who utilised AEP services and socioeconomic disadvantage was no longer significant ($p = 0.43$). Thus, the higher rates of chronic disease in socioeconomically disadvantaged areas are likely to explain the higher

utilisation of AEP services in these areas. Another factor that might explain the higher utilisation of AEP services in disadvantaged areas is the higher need for supports for physical activity in these areas due to the low availability and poor quality of spaces and facilities that support participation in physical activity (Crawford et al., 2008; Hanson et al., 2016b; Powell et al., 2006). Nevertheless, our findings provide an indication that, when referred by a GP, utilising AEP services is acceptable to people living in socioeconomically disadvantaged areas. This finding is consistent with other studies of disadvantaged communities, which emphasise the important role of health care professionals in the promotion of physical activity (Hanson et al., 2016a).

There were more patients per AEP provider in areas of greater socioeconomic disadvantage and thus AEPs located in these areas had higher caseloads compared to those in more affluent areas. This is likely a result of higher demand for AEP services in socioeconomically disadvantaged areas, due to higher rates of chronic disease(Australian Institute of Health and Welfare, 2011) and a lower proportion of providers per capita. Similarly, in relation to provision of physical activity-related services, a recent study by Bennie et al (Jason A. Bennie et al., 2016b) found that both fewer and lower-educated Australian fitness trainers (e.g. personal trainers, group instructors) worked in areas of greater socioeconomic disadvantage, compared to areas with low levels of disadvantage. Moreover, studies of other health care professionals s, such as GPs, show that providers in areas of greater disadvantage have higher caseloads, which may indicate shorter session times with patients (Scott, 2015), and potentially poorer health outcomes for patients. It has been suggested that, without regulation, the supply of health care providers is distributed to the more affluent areas, who tend to need them less. Well-designed studies are needed to determine how best to entice

providers, including AEPs, to work in disadvantaged areas, where they are needed most (Grobler et al., 2015).

A further key finding was that we found that AEP providers who are located in areas of greater disadvantage charge less for their services than those in more affluent areas and there were minimal out of pocket expenses in areas of greatest socioeconomic disadvantage. This suggests that cost is unlikely to be a barrier to accessing AEP services in areas of disadvantage. However, low consultation fees and high caseloads, which characterise AEP services in areas of greater disadvantage, may translate to reduced consultation times (R. Cant & Aroni, 2007), and subsequently a lower quality of care in these areas. Low consultation fees may also make practice unsustainable for AEPs (R. P. Cant, 2010) and encourage them to locate in more affluent areas where people have the means to make co-payments for services.

The average number of AEP services per patient was lower in areas of greater disadvantage. With the context of the present study, we can only speculate as to why this is the case. It might be due to GPs providing referrals to more than one allied health professional (the scheme allows a maximum of five services per year shared among allied health professionals). This is plausible because people living in socioeconomically disadvantaged areas are more likely to experience multiple chronic health conditions that may require care from multiple health care professionals (Australian Institute of Health and Welfare, 2016). Although in contrast to previous studies which suggest that socioeconomic position is not related to adherence to exercise referral programs, (Gidlow et al., 2007; Sowden et al., 2008) an explanation for our finding is that patients from socioeconomically disadvantaged areas are less likely to adhere to the prescribed number of AEP sessions. This is plausible because

people who experience disadvantage are more likely to experience barriers to accessing services(Australian Bureau of Statistics, 2010b). For example, the cost of taxis, inconvenience of public transport schedules, or unavailability of friends and family to facilitate transport may be prohibitive to attending multiple sessions with an AEP. A strategy that might overcome this is the co-location of AEP services in GP clinics where patients are familiar with the setting and staff and know how to get there.

The strengths of this study include the analysis of an Australian population-wide database of Medicare-funded services which have received scant research attention. Given the importance of physical activity for the prevention and management of chronic disease (Andersen et al., 2010; Dunstan et al., 2005; Hayashino et al., 2012; Hernandez-Hernandez & Diaz-Gonzalez, 2017; Olney et al., 2006; Rogers et al., 2015) and the socioeconomic patterning of physical activity and health outcomes (Australian Institute of Health and Welfare, 2011, 2014a, b; Bauman et al., 2012), it is imperative that the utilisation of AEP services across social strata be examined. Limitations of the study include that the data on AEP services was restricted to those delivered through CDMPs and therefore do not reflect the full range of services provided by AEPs through different health care systems, such as in-hospital services, or to Department of Veteran Affairs recipients. Other limitations of the study include those inherent in studies that rely on publically available data. For example, our analysis was limited to the data that is routinely collected by Australian government health departments and the data suppression rules protocols they apply (Department of Health).

CONCLUSIONS

We found that patients from areas of greater socioeconomic disadvantage accessed government-subsidised GP-referred AEP services at a higher rate than those from areas of

less disadvantage. Thus, AEP services are equitably distributed, from a utilisation perspective, and acceptable to patients living in areas of considerable socioeconomic disadvantage. We also showed that out-of-pocket expenses for AEP services were lower in areas of greater disadvantage. However, it is likely patients in disadvantaged areas receive shorter consultation times resulting from the low service fees and higher caseloads of AEPs in these areas. Further examination of exercise referral schemes is warranted, particularly whether socioeconomic disadvantage is associated with adherence to exercise sessions and health outcomes.

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