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Social engagement and health and social care use and medication use among older people

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Abstract Social engagement has been associated with improved health outcomes in older people, although the precise mechanisms by which this is mediated are not clear. The aim of this study was to examine the relationship between social engagement and health and social care use and medication use in older people. Data were derived from the 1985, 1989 and 1993 waves of the Nottingham Longitudinal Study of Activity and Ageing, a nationally representative sample of people aged 65 and over. Logistic regression models were used to determine whether social engagement predicted cross-sectional and longitudinal health and social care use and medication use. People with higher social engagement were significantly less likely to have seen their family doctor, the district nurse or home help services, and to be taking two or more medications cross-sectionally. This relationship was independent of demographic factors, physical and mental health and physical activity for contact with the district nurse or home help services. Higher social engagement was associated with reduced contact with home help services after 4 years, independent of demographic factors, physical and mental health, and with reduced medication use after 4 years in unadjusted models. Higher social engagement was associated with increased contact with home help services after 8 years, when controlling for demographic factors, physical and mental health and physical activity. Higher social engagement may help to reduce cross-sectional health and social care service and medication use but further research is required to understand the benefits of social engagement and medium- and long-term service/medication use.

Keywords Social engagement · Health, social care use · Medication use

Introduction

Social engagement has been shown to be associated with better health and health outcomes across a number of studies (e.g. Berkman and Syme 1979; House et al. 1982; Kaplan et al. 1988; Glass et al. 1999; Bassuk et al. 1999; Mendes de Leon et al. 2003; Wang et al. 2002) and is regarded as an important component of successful ageing (Rowe and Kahn 1997). Three separate, but related, components of social engagement have been assessed in the research literature in relation to health outcomes (Andersson 1998; Bennett 2002): social participation, i.e. the involvement in activities which have a social element; social networks, i.e. the number of contacts with friends and relatives, etc.; and social support, instrumental and emotional help available to an individual (Bath and Deeg 2005, this issue). In this paper we examine social participation as a component of social engagement, and here we summarise research which has assessed this component in relation to mortality and health.

Research which has evaluated the role of social participation in promoting healthy ageing includes the early work of Berkman and Syme (1979), which showed that social ties and social participation were both associated with reduced mortality in the general population. This work was extended by Seeman et al. (1987) who reported that membership in a church group, as well as social networks, were predictive of survival among people aged 70 and over. House et al. (1982) reported that involvement in certain, more active social relationships and activities was associated with improved long-term survival among older men and women, and that passive activities were associated with reduced survival. Schoenbach et al. (1986) showed that a higher social network index score was associated with improved survival when controlling for sex, race, race×sex, and age.

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The social network index included spending spare time in church activities and, when the index was broken down into its component parts, it was found that this activity was associated with improved survival among white males and black females. Bygren et al. (1996) showed that people who attended cultural events occasionally had increased risk of mortality compared with people who attended cultural events often, when adjusting for age and gender. Glass et al. (1999) reported that increased participation in social activities, e.g. church attendance, visits to the cinema, restaurants and sporting events, day or overnight trips, and playing cards, was independently associated with increased survival among older people. What emerges from these studies is that social engagement, in the form of social participation, has been demonstrated to be predictive of survival, but that social participation is measured in different ways in different studies.

The different measures suggest an inherent complexity in measuring social engagement, as well as raising important questions about how the benefits of social participation might be mediated, e.g. through better health, increased physical activity or psychological well-being. However, some social engagement activities require mobility, good health and physical activity, and thus immobility, poor health, low levels of physical activity or feeling depressed may be barriers to participation. Therefore, studying the relationship between social activity and health outcomes requires levels of health, physical activity and psychological well-being to be taken into account.

The range of health outcomes measures which has been assessed in relation to social engagement includes not only mortality (Berkman and Syme 1979; Kaplan et al. 1988; Bygren et al. 1996; Glass et al. 1999; Lennartsson and Silverstein 2001) but also functional health (Everard et al. 2000), disability (Mendes de Leon et al. 2001, 2003), cognitive decline (Bassuk et al. 1999; Aartsen et al. 2002) and the risk of dementia (Wang et al. 2002). However, health outcomes which have not been examined in relation to the social participation component of social engagement in older people include health and social care service utilisation and medication use. Given the positive association between social engagement and cross-sectional physical health demonstrated by Everard et al. (2000), being more socially active might also be associated with reduced service and medication use. Developing an understanding of relationships between social engagement and service/medication use could prove useful for developing interventions which incorporate social activity to reduce consumption of services/medications in later life.

The aim of this study was to examine relationships between social engagement and health and social care service use and medication use among older people. More specifically, objectives of the study were to determine whether overall social activity was a predictor of recent contact with the family doctor, or general practitioner (GP), as it is termed in the UK, and the district

nurse, receipt of home help support and use of two or more prescribed medications in a nationally representative sample of community-dwelling older people. The use of a single combined measure of a social engagement, the Brief Assessment of Social Engagement (BASE; Morgan et al. 1985), rather than different components of social engagement, enabled us to examine the overall benefits of social activity, irrespective of the activities undertaken. In order to understand the importance of health, psychological well-being and physical activity in any observed relationships, the study included these components in successive models. In addition to examining cross-sectional associations, the study sought to determine whether social engagement was a predictor of future health and social care service use and prescribed medication use.

Methods

Data for this study were derived from the Nottingham Longitudinal Study of Activity and Ageing (NLSAA; Morgan 1998), an ongoing survey of activity, health and well-being among older people.

Sample

Using electoral ward-level statistics from the 1981 census, three areas of Nottingham were combined to provide a study population whose demographic composition (as regards age, sex, social class, ethnicity and proportion of elderly people living alone) reflected the average national pattern for England and Wales (Morgan 1998). The resulting area included a total of 48,733 individuals served by 25 family doctors. A total of 8,409 elderly people aged 65 years and over living in the community within the survey areas were identified from Nottinghamshire Family Practitioner Committee age-sex lists, from which 1,299 eligible individuals (those alive and still living at the address provided) were randomly selected for interview. The age-sex structure of the interviewed sample was not significantly different from that of the original sample. The baseline survey was conducted between May and September 1985. Of the 1,299 individuals approached, 1,042 were interviewed, a response rate of 80%. Follow-up surveys among the survivors were conducted at 4-year intervals in 1989 ($n = 781$) and 1993 ($n = 540$), with re-interview rates of 88% ($n = 690$) in 1989 and 73% ($n = 410$) in 1993 (Morgan 1998).

Survey assessments

The relevant parts of the structured questionnaire are described briefly below. Further details of the other parts of the questionnaire are described elsewhere (Morgan 1998).

Cognitive impairment

Respondents were screened for cognitive impairment using the 12-item information/orientation (I/O) scale from the Clifton Assessment Procedures for the Elderly (Pattie and Gilleard 1979). If, after appropriate prompting, the respondent failed to achieve a maximum I/O score of 8, the interview was discontinued.

General physical health

General physical health was assessed using a health index previously validated by Ebrahim et al. (1987). This health index contained 12 items for the cross-sectional analyses. The health index scored from zero (no health problems) to 12 (multiple health problems), covering the presence or absence of heart, stomach, eyesight, sleep, or foot problems; giddiness, headaches, urinary incontinence and falls; long-term disabilities and mobility status. For the longitudinal analyses, a 14-item health index was used which contained additional items relating to contact with health and social care use and medication use, as described below, in order to control for baseline levels. Current smoking status was assessed.

Contact with health and social care services and medication use

Contacts with family doctor, community nurses and home help services in the previous month were assessed. The number of current drugs prescribed by a doctor within the previous 6 months, and being taken in accordance with the doctor's instructions, was also recorded. The interviewer asked to see the prescribed drugs, and details of these were recorded, e.g. name and dose.

Social engagement

Survey assessments of social engagement were undertaken to act as an index of well-being, and as a control variable for the social component of many physical activities. The BASE scale was formed from a 20-item additive scale (previously reported), with an overall reliability alpha of 0.7 (Morgan et al. 1985). The components of this scale included access to a telephone; whether the person had made or received a telephone call in the previous week; whether the person attended religious services or meetings; whether they had voted in the last election; whether they had taken a holiday in the previous year; whether they were planning to take a holiday in the forthcoming year; whether they used the public library; whether they had attended a group meeting or club/society in the previous month; whether they had a senior citizen's rail pass; whether they had access to a car; whether the respondent felt they had sufficient contact with family or friends; whether they got out and about as much as they would like; whether

they lived alone; whether they had many friends in the area; whether they had many friends/neighbours or relatives whom they could ask for help; whether they were employed; whether they were mobile; whether they had a television or radio; whether they had taken a newspaper or magazine on a weekly/monthly basis. Each item of the scale was given a score of 0=no and 1=yes, and all items were added together to give a score ranging from 0 (no participation) to 20 (participation in all activities).

Depression and morale

Depression was assessed using the 14-item Symptoms of Anxiety and Depression (SAD) scale, derived from the Delusions, Symptoms and States Inventory (DSSI; Bedford et al. 1976). The SAD scale focuses exclusively on recent symptoms, and comprises two 7-item subscales relating to anxiety and depression respectively. In a clinical validation exercise conducted at baseline, total SAD scores of ≥ 6 (with depression subscale scores ≥ 4) showed high levels of concordance with clinical diagnostic ratings of depression made by experienced psychiatrists (kappa coefficient = 0.7, $p < 0.001$; Morgan et al. 1987). Assessments of morale were provided by a modified version of the 13-item Life Satisfaction Index (LSIZ; Morgan et al. 1987).

Customary physical activity

'Customary' physical activity was defined as those activities with a probable minimum energy cost of 2 kcal/min, performed continuously for a minimum of 3 min at least weekly for at least the previous 6 weeks (Dallosso et al. 1988; Morgan 1998). These activities were divided into mutually exclusive functional categories which included outdoor productive activities (e.g. gardening, house and car maintenance); indoor productive activities (e.g. housework, decorating, indoor maintenance); walking (purposeful walking outside the house or garden). In administering the questionnaire, the interviewer first determined whether the respondent's participation in the activity met the criteria for 'customary', and then asked in detail about the frequency and duration of participation. Each reported activity was scored as minutes per week. Non-participation was scored as zero. In the assessment of walking, the interviewer asked in detail about walking done on the day prior to interview. If, however, this day had been atypical, then another was selected (up to a maximum of 6 days previously).

Non-continuous activities likely to contribute to muscle strength (e.g. climbing high steps, dragging heavy loads) and joint flexibility (e.g. reaching for high shelves, bending for low shelves) were also included. Typically, these tasks form discrete units of physical activity and were therefore scored in terms of frequency of performance on a 5-point scale (i.e. performed never,

occasionally, once or several times a week, daily, or several times a day).

Table 1 and Table 2 show the distribution of the categorical and continuous variables used in this study.

Statistical analyses

Cross-sectional analyses

Four sets of logistic regression models were used to determine whether there was a relationship between the social engagement score in 1985 and contact with health and social care providers and medication use in 1985. In the first set of models, the dependent variable was whether or not the person had had contact with their family doctor in the month prior to interview in 1985. In the second set of models, the dependent variable was whether or not the person had had contact with a community nurse in the month prior to interview in 1985. In the third set of models, the dependent variable was whether or not the person had received home help support in the month prior to interview in 1985. In the fourth set of models, the dependent variable was whether or not the person was taking two or more prescribed medicines in 1985. For each dependent variable, a set of five models was developed containing the independent variables described below.

Longitudinal analyses

Four sets of logistic regression models were used to determine whether there was a relationship between the social engagement score in 1985 and contact with health and social care providers and medication use in 1989. In the first set of models, the dependent variable was whether or not the person had had contact with their family doctor in the month prior to interview in 1989. In the second set of models, the dependent variable was whether or not the person had had contact with a community nurse in the month prior to interview in 1989. In the third set of models, the dependent variable was whether or not the person had received home help support in the month prior to interview in 1989. In the fourth sets of models, the dependent variable was whether or not the person was taking two or more prescribed medicines in 1989. These four sets of regression models were repeated for the same dependent variables in 1993. For each dependent variable, a set of five models was developed containing the independent variables described below.

Independent variables

For each set of models for each dependent variable, the independent variables were added cumulatively in the following order: social engagement score (models 1); demographic variables (i.e. age gender and socio-economic

class; models 2); physical health index score and smoking status (models 3); psychological well-being (i.e. SAD score and life satisfaction index; models 4); physical and functional activity (total activities contributing to muscle strength and joint flexibility) indoor and outdoor productive activities and time spent walking (models 5):

- models 1: social engagement score only;
- models 2: social engagement score, age, sex and social class;
- models 3: social engagement score, age, sex and social class, health index score and smoking status;
- models 4: social engagement score, age, sex and social class, health index score, smoking status SAD score and LSI score;
- models 5: social engagement score, age, sex and social class, health index score, smoking status SAD score, LSI score, joint flexibility activities score, muscle strength activities score, total indoor activity, total outdoor activity and time spent walking.

In the cross-sectional analyses, the 12-item physical health index score in 1985 was included in models 3 to 5. In the longitudinal analyses, the 14-item physical health index score in 1985 was included in models 3 to 5, to control for baseline health and social care service use and medication use.

For categorical variables (i.e. gender, socio-economic class and smoking status), the odds ratio and 95% confidence intervals were calculated for each category relative to the reference category. For the remaining (continuous) variables, the odds ratio and 95% confidence intervals were calculated for each increment in the variable.

Results

Social engagement and baseline service/medication use

Table 3 shows the relationships between the social engagement score in 1985 and contact with the health and social care services in the month prior to interview in 1985 and prescribed medication use in 1985. In the unadjusted model (model 1), a higher social engagement score was significantly associated with a reduced likelihood of having seen the family doctor in the month prior to interview (odds ratio (OR)=0.94; 95% confidence interval (CI)=0.90, 0.99; $p \leq 0.01$). When age, gender and socio-economic class were included in the model (model 2), the social engagement score was significantly associated with having seen the family doctor in the month prior to interview (OR=0.94; 95% CI=0.89, 0.98; $p \leq 0.01$), but when the 12-item health score and smoking status were added to the model (model 3) the association was no longer significant.

A higher social engagement score was significantly associated with a reduced likelihood of having seen the nurse in the month prior to interview (OR=0.78; 95%

CI = 0.72, 0.84; $p \leq 0.001$; models 1). When age, gender and socio-economic class (model 2), the 12-item health score and smoking status (model 3), depression and morale (model 4), and physical activity (model 5) were included in the model, the social engagement score remained significantly associated with a reduced likelihood of having seen the community nurse in the month prior to interview (OR = 0.89; 95% CI = 0.80, 0.99; $p \leq 0.05$).

A higher social engagement score was significantly associated with a reduced likelihood of having received home help support in the month prior to interview (OR = 0.70; 95% CI = 0.66, 0.75; $p \leq 0.001$; model 1). When age, gender and socio-economic class (model 2), the 12-item health score and smoking status (model 3), depression and morale (model 4), and physical activity (model 5) were included in the model, the social engagement score remained significantly associated with a reduced likelihood of having received home help support in the month prior to interview (OR = 0.84; 95% CI = 0.77, 0.92; $p \leq 0.001$).

A higher social engagement score was significantly associated with a reduced likelihood of taking two or more medications (OR = 0.90; 95% CI = 0.86, 0.94; $p \leq 0.001$; model 1). When age, gender and socio-economic class were included in the model (model 2), the social engagement score was still significantly associated with a reduced likelihood of taking two or more medications (OR = 0.91; 95% CI = 0.87, 0.96; $p \leq 0.001$), but when the 12-item health score and smoking status were added to the model (model 3) the association was no longer significant.

Social engagement and service/medication use in 1989

Table 4 shows the relationships between the social engagement score in 1985 and contact with the health and social care services in the month prior to interview in 1989 and prescribed medication use in 1989. There were no significant associations between the social engagement score in 1985 and contact with the family doctor in the month prior to interview in 1989 in the unadjusted or adjusted regression models. There were no significant associations between the social engagement score in 1985 and contact with the community nurse in the month prior to interview in 1989 in the unadjusted or adjusted regression models.

A higher social engagement score was significantly associated with a reduced likelihood of having received home help support in the month prior to interview (OR = 0.82; 95% CI = 0.76, 0.88; $p \leq 0.001$; model 1). When age, gender and socio-economic class (model 2), the 12-item health score and smoking status (model 3), and depression and morale (model 4) were included in the model, the social engagement score remained significantly associated with a reduced likelihood of having received home help support in the month prior to interview. In the final model, when physical activity was added (model 5), the social engagement score remained

significantly associated with having received home help support in the month prior to interview in 1989 (OR = 0.91; 95% CI = 0.83, 1.00; $p \leq 0.05$).

A higher social engagement score was not significantly associated with taking two or more medications in 1989 in the unadjusted model (model 1), nor when age, gender and socio-economic class (model 2), the 14-item health score and smoking status (model 3), and depression and morale (model 4) were included in the model. In the final model, however, when physical activity was added (model 5), a higher social engagement score was significantly associated with an increased likelihood of taking two or more medications (OR = 1.09; 95% CI = 1.00, 1.18; $p \leq 0.05$).

Social engagement and service/medication use in 1993

Table 5 shows the relationships between the social engagement score in 1985 and contact with the health and social care services in the month prior to interview in 1993 and prescribed medication use in 1993. There were no significant associations between the social engagement score in 1985 and contact with the family doctor in the month prior to interview in 1993 in the unadjusted or adjusted regression models. There were no significant associations between the social engagement score in 1985 and contact with the community nurse in the month prior to interview in 1993 in the unadjusted or adjusted regression models.

A higher social engagement score was not significantly associated with having received home help support in the month prior to interview in 1993 (OR = 0.92; 95% CI = 0.84, 1.01; $p = 0.06$; model 1). When age, gender and socio-economic class (model 2), the 14-item health score and smoking status (model 3), and depression and morale (model 4) were included in the model, the association was not significant. In the final model, however, when physical activity was added (model 5), a higher social engagement score was significantly associated with an increased likelihood of having received home help support in the month prior to interview in 1993 (OR = 1.14; 95% CI = 1.00, 1.30; $p \leq 0.05$).

There were no significant associations between the social engagement score in 1985 and medication use at the time of interview in 1993 in the unadjusted regression models. In model 3, however, when age, sex and social class, 14-item health index score and smoking status were included in the model, a higher social engagement score was significantly associated with an increased likelihood of taking two or more prescribed medications in 1993 (OR = 1.12; 95% CI = 1.01, 1.24; $p \leq 0.05$), although this was no longer significant in models 4 and 5.

Discussion

This study examined the relationship between social engagement and use of health and social care services

and medication use among older people. The results show that current social engagement is a powerful cross-sectional predictor of recent contact with the family doctor, district nurse and home help and of multiple prescribed drug use, independent of age, gender and socio-economic class. People who had higher social engagement were significantly less likely to have seen these service providers in the month prior to the baseline interview or to be taking two or more prescribed medications. There were, however, clear differences in the relationship between social engagement and utilisation of different services, and in the factors explaining these relationships. There are several possible explanations for these findings, which include relationships between social engagement and physical health, physical activity and mobility among older people.

One plausible explanation for the observed relationships is that people who are more socially engaged are healthier (Everard et al. 2000), and therefore less likely to need to visit their family doctor or a district nurse, receive home help support or be taking medications—indeed, physical health fully accounted for the relationships between social engagement and contact with the family doctor and medication use. However, the relationship between social engagement and contact with the district nurse and home help was not accounted for by physical health or by psychological well-being, so that although social engagement might be expected to reduce levels of depression and improve overall morale (Morgan et al. 1987), these aspects of well-being appeared to have little or no impact on contact with these services. This might be because district nurses provide clinical support for physical problems and home help provides practical support with day-to-day activities, rather than help with psychological problems.

Another possible explanation for the relationship between social engagement and service use is that older people who participate in particular social activities are more likely to be more physically active and/or mobile (Glass et al. 1999), and less likely to require district nurse care or home help support. The inclusion of variables relating to various physical activities and walking, however, still failed to explain the relationship between social engagement and contact with the district nurse and home help support. Mendes de Leon et al. (2001) showed that social interaction with friends is associated with a reduced risk of functional disability among older people, and the variables for indoor (e.g. cooking, DIY) and outdoor (e.g. household maintenance, gardening) activities used in the models in this study include activities measuring functional ability. However, these and the variables representing activities contributing to joint flexibility (e.g. reaching up high) and muscle strength (e.g. carrying loads) and time spent walking did not wholly explain the relationship between social engagement and district nurse and home help support. It appears that the benefits derived from being socially engaged extend beyond physical and

psychological health and physical and functional activity, and that the reasons for this are not clear.

A further possible explanation for the observed cross-sectional relationships is that specific groups within the population of older people in the UK at the time of the study may have been given preferential allocation of certain health and social care services, and these groups may have had lower levels of social engagement than others. For example, subgroups of people with lower levels of social engagement may have included people who were unmarried or who were widowers, and these may have received higher levels of nursing and home help support than people who were married or who were widows. Additionally, the inclusion of living alone as a variable in the social engagement scale may have also been a confounder in this way, as people who lived alone may also have been allocated services preferentially. While such explanations are unlikely to account for the observed relationships between social engagement and seeing the family doctor and medication use, further analyses could explore the importance of these potentially confounding variables in explaining the relationship with nursing and home help support.

A limitation of the cross-sectional analyses reported here is that it was health and social care service use *in the month prior to interview* which was assessed, whereas social engagement was assessed *at the time of interview*. It may be that an episode of care from the family doctor, home help or district nurse occurred in the month before the interview but ended before the interview, and the person was able to undertake or resume social engagement activities between then and the interview. However, given the short duration involved, we feel that it is unlikely that this would have a major effect on the relationships observed, and that this would have in any case reduced the size of the observed relationships, rather than exaggerating them.

A further limitation of the analyses reported in this paper is that the most recent measures of health and social care utilisation and medication use were in 1993. Although there have been some changes in the organisation and delivery of health and social care services during the intervening time, which may have affected factors associated with specific service usage, the paper nevertheless demonstrates important cross-sectional and longitudinal relationships between social engagement and general health and social service use. While the details of these services may have changed, we do not feel that these would have affected the findings reported here.

The finding that social engagement is a predictor of future receipt of home help service provides further evidence of the importance of this relationship, although the results appear contradictory over the different follow-up periods. Increased social engagement was associated with reduced contact with home help services after 4 years, independent of age, sex, baseline physical health, psychological well-being, and customary physical activity. A rather puzzling finding was that

higher social engagement was associated with *increased* contact with home help services after 8 years, when adjusting for age, gender as well as physical and psychological health and physical activity. It appears that older people who are socially engaged benefit from the associated physical activity over the next few years, which helps to reduce the need for home help support in that time period but, in the longer term, these have greater needs for support. This suggests a possible non-linear relationship between social engagement and service use over time, the precise nature of which is not clear and requires further investigation to develop a better understanding of how changes in social engagement might affect contact with home help support.

The complexity of the benefits of social engagement was emphasised by the finding that increased social engagement was associated with increased medication use when adjusting for age, gender, physical and psychological health and physical activity after 4 years, and when adjusting for age, gender and physical health after 8 years. It may be that older people who have active social engagement are generally less likely to use medications but, if health and/or levels of activity are declining, they may need to increase their medication consumption over time to maintain their level of engagement. However, further longitudinal analyses would be required to verify this possibility or to investigate other possible explanations.

The measure of social engagement used in this study contains a variety of activities relating to social engagement, and the study examined the relationship between the *overall* social engagement score and the outcomes investigated. The demonstrated benefits of active social engagement are irrespective of the activities undertaken, and the greater the number of activities, the greater are the potential benefits. However, an examination of the individual components of the scale and their relationship with demographic and other variables may help to understand the observed relationships with the outcomes used in this study. It may be that specific social engagement variables are more closely associated with age (e.g. employment), gender (e.g. taking a newspaper), marital status (e.g. living alone) and socio-economic class (e.g. planning a holiday) than other variables. A finer-grained analysis of the variables comprising the BASE scale may also be useful in trying to explain some of the longitudinal results observed here. For example, while some of the social engagement activities require a certain level of physical activity and mobility (e.g. taking holidays, using the public library), and may facilitate social interaction (e.g. attending religious services or clubs/meetings), others do not necessarily involve physical activity (e.g. making or receiving telephone calls) or social interaction (e.g. getting a newspaper or magazine, having a radio or television), but they still enable the person to be engaged with the world around them. These different components may possibly help in understanding the clearly complex relationship between social engagement and

service/medication use, and further research is seeking to identify the precise components of social engagement which contribute this aspect of successful ageing.

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