Proceedings of the International Conference on Modern Medicine and Global Health (ICMMGH 2023)
DOI: 10.54254/2753-8818/6/20230219

The inverse relationship between income and the prevalence of dementia in high-income nations

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Abstract. Dementia continues to be a serious problem worldwide. A negative relationship between the prevalence of dementia and the level of socioeconomic status (SES), such as income can be observed in most countries. The aim of the study in this paper is to explore the possible pathways that contribute to this negative relationship. This article analyses and presents three possible causes of health inequalities between SES gradients in dementia and possible solutions to them, through a large collection of articles. Differences in health literacy, housing levels and social support caused by SES such as different incomes lead to social inequalities in health through behavioral/cultural pathway， material pathway and psychosocial pathway respectively.

Keywords: dementia, SES, pathway, inequality, health.

1. Introduction

Dementia is a group of illnesses that damage a person's capacity to sustain a normal life and cause memory and cognitive function decline. It is currently a significant worldwide health concern. According to projections, there would be around 57.4 million dementia cases worldwide in 2019 and 152.8 million cases by 2050, with the majority of cases occurring in low- and middle-income nations [1-2]. In the UK, the annual cost of dementia-related expenses, such as medical care, is estimated to have exceeded £23 billion in just 2017 [3]. Less education, smoking, depression, air pollution, and other risk factors can all be modified as major contributors to dementia risk [2]. The inverse gradient of dementia prevalence in relation to socioeconomic status (SES), such as income, is still steady in most high-income countries (HIC), which is notable since it indicates that dementia's risk factors are still unequally distributed across social hierarchy [4-5]. This study's goal is to investigate the causes of this inverse association by putting forward three plausible explanations, such as variations in health literacy, housing conditions, and social support between SES groups.

To learn more about this subject, a literature search was conducted using the terms "dementia," "income," "inequality," "lifestyle," "health literacy," "housing conditions," "lifestyle," and "social support" in the Google Scholar and PubMed databases. Only the literature with a high level of thematic relevance and their associated references was included, excluding the literature on non-HIC populations. The final literature includes studies, the majority of which are systematic reviews and longitudinal studies, on the relationship between income or SES and dementia-related risk factors, as well as studies on the relationship with health literacy, housing conditions, and social support hypothesized in this article.

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There are 12 main, modifiable risk factors for dementia that are linked to neuropathological damage or cognitive reserve and have variable effects throughout life. Less education in the early years of life, high blood pressure, obesity, hearing loss, traumatic brain damage, and alcohol misuse are some of them. In later life, smoking, depression, inactivity, social isolation, diabetes, and air pollution are others. Among them, lifestyles account for 7.6% of the weighted population attributable fraction, while depression and social isolation, which are significantly correlated with social interactions, account for 7.4% [2]. These risk factors can have varied effects on a person's neuropathological state and cognitive reserve at various life stages and can build up to be important in later life. The cognitive reserve protects the brain from neuropathological damage. In other words, those who possess this cognitive reserve can withstand greater neuropathic injury without displaying signs like cognitive impairment [6].

2. Reason

2.1. Education

Education is a highly unique presence among dementia risk variables because it is also a SES and merits special attention throughout the life period. First off, children from wealthier households are more likely to have greater educational opportunities, and those with more education often have higher present and future earnings. Enhancing education has the tendency to lessen wealth disparities [7]. The two are inextricably linked over the course of a person's life because of the intergenerational stability of income, but at the same time, this relationship becomes convoluted [8]. Additionally, early education helps children develop their cognitive reserves earlier, which improves cognitive resilience as they age [9]. This is due to the accumulation of advantages as well as the fact that childhood and adolescence are crucial stages in the life cycle for growing brain plasticity, whereas education beyond the age of 20 rarely provides room for further development [10]. The inverse association between wealth and dementia prevalence in HIC can also be explained by behavioral/cultural, material, and psychosocial pathways, among others.

2.2. Behavioral/cultural pathway

First, disparities in health literacy through behavioral/cultural pathways may be used to explain the negative link between income level and dementia prevalence, as low SES groups are less likely to understand the health education material offered by the government and professionals. This propensity is frequently brought on by personality traits including poor self-control and poor long-term vision. The ability to function effectively in a health care setting refers to people's motivation and capacity to acquire, understand, evaluate, and apply health information to make health promotion decisions in their daily lives. Because this paper wants to focus on competence rather than personality, a concept called health literacy is introduced here [11].Better health literacy is associated with healthier lifestyles, according to a London-based study (OR: 0.84 (0.47, 1.50; p0.05; limited vs. better groups) [12]. Studies have indicated that leading unhealthy lifestyles is linked to greater rates of dementia, which accounts for around 55% of the overall effect of income on dementia [13]. In general, those with higher SES are more aware of dementia, which makes them more likely to participate in "protective" actions and, as a result, have a lower risk of developing dementia (HR: 2.39(1.60 - 3.58; p0.001) vs. (HR = 0.97,0.952 - 0.980; p0.001) [14]. It's also critical to recognise that there may be a reciprocal relationship between dementia and poor health literacy, which calls for additional study [15].

2.3. Psychosocial & material pathway

This association between income and the prevalence of dementia may potentially be explained by another two routes. First, in terms of the material channel, this link could be explained by variations in housing circumstances resulting from varying income levels. Social class permeates all facets of materials, which in turn affects health differently. People with lower earnings may only afford to live in homes that have worse circumstances in their geographic areas, like air pollution, which increases the risk of dementia in later life and the varying degrees of pollution that are experienced by people of

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different incomes. Research showing a negative relationship between perceived air pollution exposure and family income (OR: 1.67 (1.14-2.44) p0.05) in the lower middle income group compared to the highest income group) in German studies also lend support to this theory [16]. In addition, the relationship along psychosocial pathways may be explained by social support acting as a buffer against the deleterious consequences of stress. Because they may be more prone to have better social ties and a higher level of self-control at work, higher income and SES groups are more likely to have social support in their lives and at work [17]. Additionally, through the development of numerous models, investigations on older adults have discovered a favourable correlation between a lack of social support and both sadness and social isolation [18-19]. Due to the complexity of the specific data, there won't be a lot of exploration.

3. Discussion

In general, the three paths and the education-centered life course approach can explain this negative link. The three mechanisms include the psychological/social channel involving social support, the material pathway involving living conditions, and the behavioral/cultural pathway comprising health literacy. Nevertheless, all paths may also interact over the course of a person's life. For instance, persons who work in high-stress environments and have little incomes frequently turn to smoking as a coping mechanism.

There are various restrictions even though every effort has been made to cover all potential routes to close the current knowledge gap. First, a life course approach was used to combine three explanatory pathways to explain the inverse link between income and dementia prevalence in a way that is not sufficiently supported by the literature. More information is anticipated from upcoming longitudinal studies or intervention studies that construct various pathway models to study interrelationships. Second, there are different ways to measure "dementia" in the literature—from self- or partner-reported to doctor-diagnosed—and this inconsistency could introduce some inaccuracy. It's also crucial to note that this paper's explanatory pathways have certain limits because high-income countries have diverse characteristics from one another. According to the behavioral/cultural pathway's cultural shift theory, health disparities vary among cultures because of various national lifestyles. For instance, Finland's pervasive high drinking culture is accompanied by a high rate of alcoholism while also reducing health disparities between income levels.

4. Conclusion

In conclusion, there is an inverse gradient distribution between income and other SES for the prevalence of dementia and related risk variables, such as lifestyle and education. Accordingly, this essay suggests behavioral/cultural, material, and psychosocial paths as potential explanations for the entirety of existence. As a result, a few actions can be taken to lessen health disparities between SES and dementia in HIC. First, there are still a lot of areas in which health literacy may be enhanced. Years of health literacy have decreased the prevalence of dementia in HIC, but they have seldom, if ever, decreased or even increased the disparities in dementia among SES. Therefore, low SES groups need to be made more aware of and guided, for instance through community activities or academic instruction. Additionally, to the great advantage of those with low SES, the government should work to relocate polluting factories as far away from residential areas as possible. Additionally, those with low SES should have easier access to social supports including community companionship and healthcare.

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