Social Science & Medicine 192 (2017) 94–101

Contents lists available at ScienceDirect

Social Science & Medicine

journal homepage: www.elsevier.com/locate/socscimed

# Hearing impairment, social support, and depressive symptoms among U.S. adults: A test of the stress process paradigm

Jessica S. West

*Department of Sociology, Duke University, 417 Chapel Drive, Durham, NC 27708, USA*

ARTICLE INFO

*Article history:*
Received 12 June 2017
Received in revised form
31 August 2017
Accepted 20 September 2017
Available online 21 September 2017

*Keywords:*
Stress process paradigm
Hearing impairment
Social support
Mental health
Longitudinal
Fixed effect
Health and Retirement Study

ABSTRACT

Hearing impairment is a growing physical disability affecting older adults and is an important physical health stressor, but few studies have examined it in relation to mental health outcomes and even fewer have considered the role of social support in buffering this relationship. The current study builds on the stress process framework and uses longitudinal data from three waves of the Health and Retirement Study (2006, 2010, 2014) to examine the relationship between hearing impairment and depressive symptoms among U.S. adults aged 50 and older (n = 6075). The analysis uses fixed-effects models to assess this relationship and examine the extent to which social support mediates (buffers) or moderates (interaction) the association. The results found that worse self-rated hearing was associated with a significant increase in depressive symptoms, even after controlling for sociodemographic factors. Social support did not buffer this relationship. Instead, social support interacted with hearing impairment: low levels of social support were associated with more depressive symptoms but only among people with poor self-rated hearing. Among those with excellent self-rated hearing, low levels of social support did not increase depressive symptoms. Moreover, high levels of social support reduced depressive symptoms for those with poor hearing. These findings suggest that hearing impairment is a chronic stressor in individuals' lives, and that responses to this stressor vary by the availability of social resources.



## 1. Introduction

Over two decades ago, Verbrugge and Jette (1994) posited that both physical and mental well-being are involved in health decline as individuals age. Since then, research has increasingly noted the importance of jointly assessing mental health and physical health because examining them separately creates an artificial boundary between the two (Kelley-Moore and Ferraro, 2005; Pearlin et al., 2007; Read et al., 2016). Numerous studies have shown that having a physical health condition (e.g. cancer, heart disease, or arthritis) can lead to poorer mental health outcomes (e.g. depression) (Polsky et al., 2005) because it is challenging to individuals' sense of identity and is therefore psychologically stressful (Charmaz, 1983).

A growing, but understudied, physical ailment affecting population health is hearing impairment. It is the third most common chronic condition in older individuals behind hypertension and arthritis (Lin et al., 2011) and is predicted to have a prevalence rate twice that of diabetes by 2025, in part due to an aging population (Cederroth et al., 2013). Recent research projects that 15% of adults aged 20 or older will have a hearing impairment in 2020, with that number climbing to 23% in 2060 (Goman et al., 2017). Moreover, individuals aged 70 or older are expected to be disproportionately affected, which is concerning given that this is a vulnerable population whose size will continue to increase as baby boomers age (Goman et al., 2017).

To date, studies assessing the relationship between hearing impairment and mental health are limited, and those that exist yield mixed results. A comprehensive review of existing research found that most longitudinal studies were based in an international context (e.g. Australia, The Netherlands, Japan, and England) and the two based in the U.S. used the Alameda County Study (Strawbridge et al., 2000; Wallhagen et al., 2001). Of the longitudinal studies, some find that hearing loss results in higher levels of depressive symptoms (Kiely et al., 2013; Saito et al., 2010; Strawbridge et al., 2000; Wallhagen et al., 2001), while others find little or no association between the two (Chou, 2008; Pronk et al. 2011, 2014; Stam et al. 2016). Cross-sectional studies generally find a significant association between hearing impairment and

*E-mail address:* jessie.west@duke.edu.

https://doi.org/10.1016/j.socscimed.2017.09.031
0277-9536/

more depressive symptoms (Capella-McDonnall, 2005; Kramer et al., 2002), while some report that the association depends on factors such as age, with younger people experiencing more depressive symptoms than older people (Nachtegaal et al. 2009; Tambs, 2004).

At least three factors may be contributing to these mixed results. First, the use of different depression indices could produce conflicting findings because the measures included in the Diagnostic and Statistical Manual of Mental Disorders scale differ from those in the Center for Epidemiologic Studies Depression Scale. Studies using the former scale find a significant association between hearing loss and depression (Strawbridge et al., 2000; Wallhagen et al., 2001), while those using the latter are more mixed (Chou, 2008; Kiely et al., 2013; Pronk et al. 2011, 2014). Second, there are varying follow-up times in longitudinal studies that could affect the ability to find significant results because the impact of hearing loss on depression may be immediate or may take time to emerge (e.g. Kiely et al., 2013; Pronk et al., 2011; Saito et al., 2010). Third, some studies have small sample sizes (Pronk et al., 2011; Stam et al. 2016) that could result in non-significant findings, particularly when multiple covariates are included in the analyses.

In addition to these mixed findings, extant literature has yet to consider the role of social support in conditioning the relationship between hearing impairment and depressive symptoms. The stress process paradigm posits that social support can alter the relationship between a stressor and depressive symptoms by preventing an individual from perceiving a potential stressor as stressful or by reducing the severity of a reaction to an actual stressor (Cohen and Wills, 1985). Physical health problems are highly stressful for individuals and there is considerable evidence that social support is an important resource that helps them cope more effectively by encouraging engagement in positive health behaviors and reducing reactions to stress (Hollingshaus and Utz, 2013; Milner et al., 2016; Stanton et al., 2007; Waverijn et al., 2017). Hearing impairment is a physical disability that impacts functioning across all domains of daily life (Dalton et al., 2003), yet few studies have treated hearing impairment as a stressor in the stress process model formulation. Thus, the extent to which hearing impairment interacts with other factors, such as social support, to affect mental health remains unexplored (Stam et al. 2016).

The current study contributes to this literature and a growing body of work on the physical-mental health connection in several ways. First, it conceptualizes hearing impairment as a physical health stressor and examines its relationship to depressive symptoms. Second, it builds on the stress process paradigm to explore two ways in which social support could influence the association between hearing impairment and depressive symptoms: by buffering or mediating the original relationship or by interacting with hearing impairment to influence depression at different levels of social support (e.g. low and high levels). Third, it employs longitudinal data from three waves of the Health and Retirement Study (HRS) (2006, 2010, and 2014) to overcome some of the obstacles that have contributed to mixed findings in previous studies. The HRS is nationally representative, spans nine years, and contains large samples that provide sufficient power to apply the stress process paradigm to hearing impairment.

## 2. Background

### 2.1. Stress, social support, and health

Stress process researchers distinguish between two types of stressors. First, *life events* are discrete changes in individuals' lives that have negative health consequences. Oft-cited examples include accidents, loss of employment, or widowhood. Second, *chronic strains* are ongoing, long-term difficulties that negatively affect well-being, like living in poverty or having a chronic illness (Pearlin, 1989). Both types of stressors can be sources of *stress proliferation*, a perspective within the stress process paradigm positing that stressors associated with one situation (e.g. chronic illness) may lead to the emergence and accumulation of stressors in other life domains (e.g. financial strain due to the inability to find work) (Pearlin, 1989; Pearlin et al., 1997).

Physical illness has been classified as a chronic strain because it requires the long-lasting management of social and instrumental activities (Pearlin, 1999). Being diagnosed with a physical illness often necessitates adjustments that occur over time and across emotional, behavioral, and other life domains (Stanton et al., 2007). Charmaz (1983) describes physical illness as a form of suffering that can challenge an individual's identity and personal relationships and cause a loss of self-image, rendering it psychologically stressful. Other research supports this idea, finding that physical health conditions such as cancer, heart disease, and arthritis lead to an increase in depressive symptoms among adults (Polsky et al., 2005; Schnittker, 2005). Research has also applied the stress process model to broad definitions of physical disability and finds that having a physical disability is associated with symptoms of psychological distress, including anger, depression, and anxiety (Alang et al., 2014; Brown and Turner 2012; Muramatsu et al., 2010).

Leading explanations for these relationships have focused on theories of stress and coping to understand how individuals adjust to physical illness and disability (Aneshensel, 1992; Stanton et al., 2007). One important theory of stress and coping is the stress-buffering model which is grounded in the stress process paradigm. This paradigm recognizes that the stressors that individuals experience and the resources available to them can alter the health consequences of stressors (Pearlin, 1989; Pearlin et al., 1981; Turner, 2013). Social support is one such resource and the stress-buffering models specifies at least two ways that this alteration may occur. First, higher levels of social support can be protective by buffering (mediating) the effect of the stressor on mental health (Cohen and Wills, 1985). In this scenario, individuals with high levels of social support may be protected against negative mental health outcomes when exposed to stress. For example, social support buffers the effects of stress for parents of pediatric cancer patients because it provides them with more coping options and helps them balance competing demands between work and caregiving (Gage-Bouchard, 2017).

Second, the stress-buffering model posits that social support can be protective by interacting with (moderating) the stressor itself. In this scenario, social support has a stronger protective effect on depressive symptoms under conditions of high stress compared to conditions of low stress (Cohen and Wills, 1985). For example, one study found higher levels of depression among students with low social support compared to those with high social support, but only under conditions of high stress not under conditions of low stress (Wang et al., 2014).

To date, few studies have conceptualized hearing impairment as a stressor linked to health outcomes. Put in terms of the stress process model, hearing impairment is a stressor that gives rise to the accumulation of additional stressors in the form of stigma, discrimination, social and emotional loneliness, and social withdrawal (Erler and Garstecki, 2002; McGee, 2015; Mick et al., 2014; Pronk et al., 2013). Under the stress-buffering model, social support could provide the coping resources necessary to mediate the association between hearing impairment and depressive symptoms. Additionally, if social support interacts with hearing impairment (moderation), individuals with hearing impairment who have higher levels of social support will be protected against an increase in depressive symptoms. The current study fills this gap in the