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Home-Delivered Meals and Nutrition Status Among Older Adults

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Abstract

The trend among older adults in the United States is to "age in place" instead of opting for institutionalization. To maintain older adults with chronic conditions in their homes and to improve health after hospitalization, comprehensive social, health, and nutrition services are essential. Quality of dietary intake is crucial and yet often underestimated. Calorie needs decrease with age while nutrient needs remain the same, even increasing for some nutrients. This poses difficulties for individuals with functional disabilities who are unable to shop and cook due to physical or mental limitations or on a limited budget. The Older American Act home-delivered meal (HDM) program offers at least 1 healthy meal per day, 5 or more days per week, and targets individuals homebound due to illness, disability, or social isolation and those with greatest economic or social need. This review summarizes the available literature on the relationship between HDM and health outcomes. The HDM program is difficult to evaluate because of the multifactorial effect on health status. However, national surveys and smaller studies show that it is well targeted, efficient, and well liked; provides quality food to needy individuals; and helps individuals remain living independently. Studies show that HDMs improve dietary intake, with greater health benefits when more meals reach the neediest individuals. HDMs also decrease institutionalization of older adults and resulting healthcare expenditures. However, funding has not kept up with increased demand for this program. More studies with improved designs may provide more information supporting the program's impact on nutrition status and decreased health expenditures. (*Nutr Clin Pract*. 2014;29:459-465)

Keywords

meals; food supply; aged; nutritional status; home-delivered meal; food security; older adults; Older Americans Act

The population of older Americans continues to expand. Not only is the baby boom generation reaching age 65 years, but people are living longer. As a result, the need for health services for the older adult population is also increasing. In addition, we know that the trend among older adults in the United States is to "age in place" in the community and at home instead of opting for institutionalization. Older adults actually prefer this,[1] and government encourages it because it is less costly. Over the past decade and with the recent economic downturn, governments at all levels have looked at ways to decrease expenditure on healthcare services. One approach is to encourage older adults to age in place, thus economizing on long-term institutional care. Another approach is to decrease hospital expenditure with emphasis on the prevention of rehospitalization of recently discharged patients.

Also, to maintain older adults with chronic conditions in their homes and improve people's health after an acute episode in the hospital, comprehensive social, health, and nutrition services need to be provided. That is why aging in place has recently become a priority for the Administration on Aging (AOA) within the Administration for Community Living in the Department of Health and Human Services. The AOA is working through the National Aging Services Network, a system of more than 29,000 home- and community-based organizations in the United States, to facilitate access by older adults and their caregivers to services, including home-delivered meals, transportation, and case management; in-home services such as personal care, chore, and homemaker assistance; and center-based services such as congregate meals, adult day care, and respite care. These home and community services are funded in part by the Older Americans Act (OAA).

One of the nutrition programs of the Older Americans Act (OAA), the home-delivered meal (HDM) program, is targeted toward individuals who are homebound due to illness, disability, or geographic isolation and to those with the greatest economic or social need. Special attention is given to low-income minorities, rural older adults, those with limited English proficiency, or those at risk of institutional care.[2] The HDM program must offer at least 1 meal per day, 5 or more days per week, and each meal must provide a minimum of one-third of the daily Recommended Dietary Allowances (RDAs) established by the Food and Nutrition Board, Institute of Medicine and comply

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with the *Dietary Guidelines for Americans*.[3] The OAA requires the services of a dietitian or an individual with nutrition expertise at the state and local levels to provide, at a minimum, menu review and analysis and, at the federal level, to administer the program.

The quality of dietary intake is particularly crucial for the recovery process among older adults, because calorie needs decrease while nutrient needs remain the same or even increase for some nutrients. Therefore, nutrient density is essential. This can be particularly difficult to obtain for individuals with functional disabilities who are unable to shop or cook due to physical or mental limitations, those with limited access to transportation who have no nearby grocery stores, and those on a limited budget who must make difficult decisions about how to spend their money. Individuals on limited budgets may be forced to choose between paying for food or paying for their medication,[4,5] and it is likely that a similar choice must be made between food and other basic needs such as housing, transportation, social services, and medical care. These risk factors may lead to food insecurity and an inadequate diet.

HDM Program and Food Insecurity

HDM could improve food security of older adults by decreasing their need for shopping and cooking and providing a consistent source of affordable, quality food, thus contributing to their ability to live independently in their own homes.

Food insecurity is defined by the U.S. Department of Agriculture as "limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways."[6] To obtain and monitor food security prevalence in the United States, a questionnaire is administered yearly to a representative sample of the population as a supplement to the Current Population Survey within the Census Bureau. The results of the survey conducted in 2012 showed that 9.1% of U.S. households of older adults lived alone, and 8.8% of U.S. households with older members were food insecure.[7] This may be an underestimation of food insecurity because the questions in the survey are based on ability to afford food. Although poverty is often the underlying cause of food insecurity, a segment of older adults may have enough money to purchase food but may be unable to access or use that food because of physical and mental limitations.[4,8,9] To address this issue, in 2003, Wolfe et al suggested revising the definition of food insecurity for the older adult population to say "the inability to acquire or consume an adequate quality or sufficient quantity of food appropriate for one's health in socially acceptable ways, or the uncertainty that one will be able to do so."[9]

Food insecurity in older adults is associated with poor nutrition status and many unfavorable health outcomes. These outcomes include, but are not limited to, low nutrient intakes,[10-12] unhealthy body weight and body size,[13] poor self-reported health status,[11] anemia,[14] multimorbidity and disability,[12,15] lower cognitive function,[16] anxiety and depression,[13,14] and decreased quality of life.[17,18] Sharkey[12] studied food security issues in homebound older adult populations and reported that the odds of having 3 or more diseases that affect daily activities were more than 2 times higher for women experiencing conditions related to food insecurity. Also, those who were at risk of being food insecure were almost 2- to 3-fold more likely to have low intake of 8 nutrients (energy, protein, calcium, magnesium, phosphorus, folate, vitamin E, and zinc). In turn, poor nutrition status is associated with functional limitations, potentially leading to poor health, greater risk for acute care services, and thus a smaller likelihood of maintaining independence.[19,20]

Targeting of the HDM Program to Vulnerable Populations

Results of some studies underscore the importance of targeting the HDM program to vulnerable populations.[21-23] Data from 2 studies conducted among HDM recipients indicated that being black, having an income ≤125% of the federal poverty level, and living alone were factors associated with lower nutrient intakes.[21] Also at higher nutrition risk were Mexican American homebound participants who, compared with non–Mexican American participants, were more likely to report very high nutrition risk, independent of poverty status and other covariates.[22] Location is another factor in vulnerability: 1 study showed that rural older adults relied on family members for help with shopping and cooking to a greater extent than did their urban counterparts.[23]

Since the HDM program targets individuals who are vulnerable, but not necessarily due to low income alone, the program is not means tested for participation. A contribution from the recipient toward the cost of the meal is suggested. Contributions are voluntary and confidential, and individuals determine for themselves what they are able to contribute according to their means. This program is very effective at leveraging funds from nonfederal support. It was estimated from the national evaluation conducted in 1992–1995 that for every federal $1 provided for the HDM program, nearly $3.55 was leveraged through individual contributions, external fundraising, or state and local government partnerships.[24] A more recent study shows that about 69% of total expenditure for HDMs came from sources other than the OAA funding.[25] The HDM program also relies heavily on unpaid volunteers to deliver those meals to individuals' homes. As a result, in addition to a nutritious meal, individuals receive regular contact by a volunteer who interacts with them upon meal delivery. These contacts may be the only socialization that recipients receive and could provide important help in an emergency situation.

HDM programs serve a large number of older adults, but many more adults have needs that are not being met due to lack of funding for the program. In a 2011 report, the Government Accountability Office (GAO) found that 9% of low-income older adults received HDM services nationally, but many more

adults likely needed services and did not receive them. It was estimated that 88.5% of low-income older adults with 2 or more types of difficulties in obtaining or preparing food did not receive HDMs.[26] This may be partly due to limited funding and the resulting lower capacity for outreach to the needy population in the community. It is, therefore, of importance for health professionals, including social workers, discharge planners, and clinical dietitians, to be familiar with the community-based nutrition programs for referral.

Funding of the HDM Program

From 1990–2013, federal appropriations for nutrition services declined by 26%.[27] The OAA, which funds the nutrition programs, was due for reauthorization in 2011, but this did not happen (although Congress has continued to appropriate funds). In addition, sequestration has contributed further cuts to these programs. This reduction in purchasing power has led to an 8.6% decline in meals served. The same economic downturn that resulted in decreased funds for OAA nutrition programs has caused an increase in demand for the programs. According to an AOA report, there was an 80% increase in requests for HDMs in fiscal year 2009.[28] Also, a report by the American Association of Retired Persons (AARP) indicated that 33% of states had increased demands for HDMs in 2010.[29] More significantly, 79% of the Area Agencies on Aging (the nationwide network of agencies responsible for delivering community services to older adults) saw increased requests for HDMs, of which 22% were unable to serve all clients who requested those services.[30]

In a 2009 national survey of local HDM providers (n = 348), 31% had a waiting list and 2% were planning on starting one (N. Sahyoun, unpublished data, 2010). The AOA does not require states or local agencies to maintain waiting lists and, therefore, this information may be an underestimate of true need. The reduced budget and growing waiting lists for this program have led to limitations in outreach to community-living older adults. So, the neediest in the community may not necessarily be aware of these services to request them.

Partly due to this rising demand, some states have opted to transfer funds away from their congregate meal site programs to their HDM programs. Ultimately, expenditure for HDMs has increased from 1990–2013 by 44% at the expense of the other nutrition programs. Nevertheless, this still falls short of need, considering that the number of individuals 60 years and older has increased by almost 50% in this period. Decline in purchasing power compared with the potential increase in demand for services translates into total federal funding for OAA nutrition services of about $25/year per older individual in 1990, compared with just over $12 in 2013.[27]

During congressional hearings for the reauthorization of the OAA, a recurring question always posed by members of Congress is whether the programs funded by the OAA save money. The response to this question may determine the level of funding for this program and thus its growth and effectiveness. Therefore, it is essential to review what we know of it.

Evaluation of the HDM Program

The HDM program is difficult to evaluate because of the multifactorial nature of the health status of the participants: an aging population with many chronic health conditions. However, it is an established fact that nutrition and health status are interrelated and that a diet devoid of enough protein, vitamins, and minerals can lead to a downward spiral in health status. The importance of the quality of food intake is often underestimated, and a meal 5 days a week could potentially make a difference in an older person's life. However, for evaluation purposes, it is important to know what other foods the individual is eating in addition to the meal provided and, on the other hand, what people would be eating if they did not get at least this 1 nutritious meal. In addition, there is very limited standardization required by the AOA, so HDM programs are quite diversified across the nation and within communities. This allows flexibility in implementing the program, but it also compounds the difficulties with its evaluation.

Despite these difficulties in evaluating this program, a few studies have informed us of the characteristics of participants, utilization of the meal, the health and nutrition status of participants, and the impact of the program on nutrition status and on potential costs to the healthcare system. This information is mostly derived from (1) a national Congress-mandated evaluation study of the OAA conducted between 1993 and 1995, (2) a series of yearly national surveys of representative samples of the population conducted via telephone, and (3) smaller, localized studies.

Characteristics of HDM Participants

Data from the national evaluation showed that the program was well targeted toward those who were the most at risk and had the greatest economic or social need. In that study, HDM participants were 2 times more likely to live alone compared with 60-year-old individuals living in the United States and were more likely to be widowed, divorced or separated, or never married. A higher proportion of minority older adults participated in the HDM than were represented in the older U.S. population overall (25% vs 14% of nonparticipants), and 90% of homebound meal participants had incomes below 200% of the U.S. poverty line. In addition, educational attainment of homebound HDM participants was lower than that of U.S. older adults overall.[24] Smaller studies also lent support to these findings, showing that 18.2%–51.9% of HDM recipients or those on the program's waiting list were considered food insecure,[18] and 80% or more were unable to shop and cook.[31]

More recently, data from the national survey conducted in 2009 indicated that 56% of HDM recipients lived alone and 31% reported difficulty with 3 or more limitations in activities of daily living (ADLs).[32] People who live by themselves and who have difficulty performing 3 or more ADLs are at increased risk of nursing home placement because they may be isolated or lack support. OAA program participants, especially those receiving HDMs, case management, homemaker services, and family caregiver support, are much worse off than the national population and at higher risk of institutionalization. In fact, in 2012, 92% of HDM recipients reported that services provided by the OAA programs allowed them to remain in their homes.[33]

Participant Satisfaction With and Utilization of HDM

In order for a program to be effective, meals must be deemed acceptable by clients, as this makes them more likely to remain on the program and consume all the food provided. Results from the national survey conducted in 2005 show that the majority of participants ate all or most of their meals. Approximately 95% or more of respondents usually ate all of the meat, poultry, fish, eggs, fruits, and vegetables served. The food items with the lowest consumption (85%) were nuts, tofu, or beans. In addition, 88% of HDM participants in 2012 rated the meals as good to excellent.[34] Similar results were obtained by other studies. For example, in a study of a representative sample of HDM participants in New York (n = 1505), 77% surveyed reported overall satisfaction with meals in terms of taste, variety, ease of preparation, healthfulness, and fit to religious or cultural needs.[35] Similarly, a survey of clients in a program in Lubbock, Texas, reported satisfaction with service and meal quality.[36] Although these studies indicate widespread acceptance of the meals, the quality may vary by location. For example, in a small study (n = 150), the authors reported that on average, a fifth of the meals served were not consumed by most program participants, especially among women who lived with others.[37] The meals are mandated to have a specific nutrient composition, but the quality and taste of meals may vary by state and nutrition site. Small studies such as this one point to issues that need to be addressed locally and indicate the importance of assessing regularly the quality of the meals and the satisfaction of participants in order to adjust meals as needed. Paying attention to client needs and preferences to make the food accessible and enjoyable can increase utilization of meals and thus nutrient intake.

Results from the national survey of 2012 showed that some participants rely heavily on HDMs. About 59% of participants stated that the food delivered provided half or more of their total food intake for the day. In fact, about 24% stated that the meal made up more than half of their daily intake.[38] Even more concerning is that 14% of those surveyed in the New York study indicated that they relied solely on food from the program.[35]

Impact on Nutrient Intake, Nutrition Status, and Health Outcomes

Most studies that assessed dietary intake of HDM recipients did not include control groups and so were unable to provide information on the extent of the impact of the HDM on overall dietary intake. However, these studies do point to the nutrients that are not consumed optimally and were reported consistently to be lacking among this population group, despite receiving a meal. These include energy,[39,40] calcium,[39-41] magnesium,[39-41] and zinc,[39-41] with studies showing additional deficiencies in iron,[42] vitamin B_6,[39] vitamin E,[41] and vitamin D.[41] Of particular note is the study by Sharkey et al[41] in 2002 that reported a less-than-adequate intake of calcium in 96% of HDM recipients and of vitamin D by 99% of subjects, based on three 24-hour recalls. Deficiencies in calcium, vitamin D, and magnesium are especially concerning for older adults as these nutrients, along with phosphorus, are considered by the Food and Nutrition Board of the Institute of Medicine to be key nutrients in the development and maintenance of bone. Low intakes of these nutrients were shown to be significantly associated with lower levels of lower-extremity physical performance in homebound older adults receiving HDMs.[43] These results highlight nutrients of concern to which providers and policy makers should pay special attention. In addition, these results suggest that without the meal, the nutrition status of individuals may be even more severe.

The impact of a meal on nutrient intake is more obvious from a study by Walden and coauthors.[44] Their results showed that, compared with nutrient intake on weekdays when clients received a daily meal, nutrient intakes on weekend days were more likely to contain insufficient protein, thiamin, riboflavin, calcium, iron, and phosphorus.[44] Although there was no designated control group in this study, the authors stated that improvement of participants' intake on days when they received meals is indicative of the positive impact the program had on their nutrition status.

In addition, 2 other studies comparing HDM recipients with a control group that did not receive meals demonstrated that diets of older adults can benefit directly from home-delivered meals. In the National Evaluation Study, both ambulatory and homebound participants were better nourished, with 4%–31% higher mean daily nutrient intakes than nonparticipants. Participants had consistently higher levels of essential nutrients than did nonparticipants: all were significantly higher except for vitamin B_{12} and iron.[24] Also, in a longitudinal study, researchers assessed HDM recipients compared with a nonrandomized group of older persons receiving other services (ie, case management, homemaking/personal care, housekeeping services, social adult day care, and/or home health aid services). After 6 and 12 months, participants showed greater improvements in most dietary intake variables than either a non-HDM comparison group or HDM participants who did not eat an HDM on the day of the assessment. Intake increased

significantly in a variety of fruits and vegetables, vegetable servings, β-carotene, vitamin E, and magnesium.[45]

Impact of Additional Meals

Various studies have compared 2 groups receiving traditional HDM service and some form of altered HDM service. These results show that any addition to or increase in HDM service led to increased benefits to the clients, indicating that these meals are in fact making a difference in older adults' dietary intake. Researchers compared the traditional OAA HDM program of 5 hot meals per week with an enhanced HDM program of 3 meals and 2 snacks per day for 7 days, both provided to recipients for 6 months. The meals were delivered weekly, required some preparation, and met 100% of the RDA values for older adults. Subjects were from waiting lists for the HDMs and were either at risk of malnutrition or malnourished as determined by the Mini Nutrition Assessment (MNA).[46] The group receiving more meals gained significantly more weight over the 3 months, as per the goal of the intervention, and their nutrition status improved more quickly. Similar results were reported by a study that provided both breakfast and lunch to some participants. Those who received the extra meal had greater energy and nutrient intakes, greater levels of food security, and fewer depressive symptoms than did the comparison group, who received only lunch.[47] Both of these studies show that, for at-risk participants of an HDM program, the more robust the assistance they receive, the more quickly their status can be improved.

Impact on Food Security

In addition to improving nutrient intake and nutrition status, HDM programs may contribute to improving food security. In a study that examined the status of food insecurity among HDM participants and those on a waiting list, the results showed that the waitlisted people reported higher rates of persistent food insecurity (45.9%) or became more food insecure (10.0%) than did the participants (29.3% and 7.1%, respectively) over a 4-month period. In addition, after 4 months of receiving meals, the number of people receiving HDMs who ranked as food insecure decreased by 9.5% compared with a decrease of 1.9% among those who were waitlisted.[48]

Researchers who conducted the study of HDM recipients in New York also reported a decrease in food insecurity among recipients of the HDM, from 23% to 13% in the 6-month sample and from 29% to 13% in the portion of the sample that was retained for 12 months.[45]

Impact on the Risk of Institutionalization

HDM programs can also have a significant impact on preventing institutionalization among hospital-discharged individuals by helping them through their initial recovery process, until they are able to provide for themselves and discontinue the program. This could be a financially efficient use of the service: it may prevent individuals from using nursing facilities for nutrition support, and it opens up a spot for a new client once the low-care individual is healthy enough to shop and cook again. Results from a study of the HDM programs in New York indicated that recent hospital discharge was the characteristic associated with the highest relative probability of program discontinuance. Individuals who were recently discharged or who had non–hip fractures were more likely to leave the HDM program when they were able to cook for themselves again.[49]

As mentioned previously, an overwhelming majority (92%) of HDM recipients reported that the meals helped them to stay living independently in their homes.[33] These results were supported by findings in another study.[50] Without these meals, these adults would require institutionalized care and possibly use Medicaid funds to pay for that care. According to the Market Survey of Long-Term Care Costs conducted by the Metropolitan Life Insurance Company, the average cost for a year in a semi-private room in a nursing home is equivalent to $81,030,[51] while the cost of a meal 5 days a week for 50 weeks is equivalent to $1390. This means that the cost of 1 week in a nursing home ($1554) is higher than the cost of 1 year of HDMs.

In 2013, Thomas and Mor[52,53] published 2 studies showing that providing HDMs is effective in keeping older adults with low-care needs out of nursing homes. Their study used state program reports and nursing home facility-level data for 16,020 nursing homes to model the relationship between state spending on OAA services and the percentage of low-care residents in nursing homes. They found that if all states had increased by 1% the number of adults 60 years and older who received HDMs in 2009, an estimated 1722 older adults with low-care needs would no longer require nursing home care, saving the states more than $109 million in Medicaid expenses. Although this was true for 26 states with high Medicaid nursing home expenses, the authors reported that for 22 states, net costs would have incurred, at least initially, because of the large older adult population living in those states.

A prospective study of Indiana Medicaid claims data from June 2001 to December 2004 (n = 1354) showed that a greater volume of HDM services was significantly associated with a lower risk of hospitalization for adults older than 65 years receiving home- and community-based services from the aged and disabled waiver. The effect of the other 2 services (attendant care and homemaking) on risk for hospital admission diminished over time, but the effect of HDM services did not.[54]

The results of these studies suggest that HDM programs may decrease institutionalization of older adults, resulting in a decrease in healthcare expenditures.

Summary

Overall, the HDM program is well targeted, is efficient, and provides quality food to older adults at a time when they may not be able to do so themselves. A government performance report rated the HDM program as "effective," the highest rating a program can achieve.[55] Although evaluation of the program is difficult because of the age and health status of participants and the limited number of studies with rigorous study designs, a review of literature provides some insight into the benefits and worth of this program. Studies show that the meals provide improved dietary intake among participants and that the more meals that are provided to the neediest individuals, the greater the health benefits. For a segment of meal recipients, 1 meal a day may still leave those who are unable to shop and cook and those who are socially isolated vulnerable to inadequate intake. It is possible that, for these individuals, this single meal contains most of the nutrients that will be consumed for the day.

A large segment of surveyed individuals overwhelmingly believe that these meals contribute to keeping them independent and living at home. This benefit could result in substantial savings in Medicaid expenditure and contribute to individuals' improved quality of life, since the majority of people prefer to live at home. Funding for the HDM program is a cost-effective investment, but, despite the fact that its funding has increased at the expense of other nutrition programs, many needy people are still not being served, either on waiting lists or remaining unaware of the program's existence. These increased needs and the persistent limited funding have led to some programmatic changes and adjustments of the meal delivery system. For example, programs have reduced their menu offerings or tried delivering a week's worth of frozen meals once a week instead of daily, and some programs now use mail couriers for delivery of meals. Although these cost-saving changes may enable continued service to older adults, they have nonetheless decreased the daily social contact between volunteers and the older person and thus diminished the link to the socially isolated individual. There is also concern that cost-cutting measures may affect client satisfaction with the quality of service and meal choices.[33]

Empowering seniors to remain healthy and economically secure in their own homes and communities reduces spending on more costly entitlement programs. However, more studies are needed to examine the impact of the HDM program on people's nutrition and health outcomes. The AOA has recently funded a national evaluation of the OAA nutrition programs, which is currently in the implementation stage[56] and will become available over the next few years. The latest national evaluation was conducted in the early 1990s, and so the upcoming results are highly anticipated.

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