Interventions to Reduce Ageism Against Older Adults: A Systematic Review and Meta-Analysis

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Background. Research has found a strong link between ageism, in the form of negative stereotypes, prejudice, and discrimination toward older people, and risks to their physical and mental health. Little is known, however, about the effectiveness of strategies to reduce ageism.

Objectives. To assess the relative effects of 3 intervention types designed to reduce ageism among youths and adults—education, intergenerational contact, and combined education and intergenerational contact—by conducting a systematic review and meta-analysis.

Search Methods. We searched PubMed, PsycINFO, AgeLine, EBSCO, Embase, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Global Index Medicus, Database of Abstracts of Reviews of Effects (DARE), Epistemonikos, Cochrane Database of Systematic Reviews, Campbell Collaboration, PROSPERO, GreyLit, and OpenGrey. We identified additional records by hand-searching reference lists of relevant review articles as well as records included in the meta-analysis. Two independent reviewers completed the search and screening process.

Selection Criteria. Eligible studies were those that (1) evaluated an intervention designed to reduce ageism, (2) examined at least 1 ageism outcome in relation to older adults, (3) used a design with a comparison group (randomized or nonrandomized), and (4) were published after 1970, when the ageism concept was developed.

Data Collection and Analysis. Two independent reviewers extracted study-level data from records using a common data collection spreadsheet. They also assessed study quality by using the Cochrane Risk of Bias Tool, and used the Grading of Recommendations, Assessment, Development, and Evaluations (GRADE) tool to assess quality of outcome evidence. Primary outcomes were attitudes toward older people and accuracy of knowledge about aging and older people. Secondary outcomes included comfort with older adults, anxiety about one’s own aging, and interest in working in the field of geriatrics or gerontology. We carried out meta-analyses with statistical mixed models.

Main Results. We identified 63 eligible studies (1976–2018) with a total sample of 6124 participants. Ageism interventions demonstrated a strongly significant effect on attitudes (differences of standardized mean differences (dD) = 0.33; P < .001), knowledge (dD = 0.42; P < .001), and comfort (dD = 0.50; P < .001), but no significant effect on anxiety (dD = 0.13; P = .33) or working with older adults (dD = —0.09; P = .40). Combined interventions with education and intergenerational contact showed the largest effects on attitudes. We found stronger effects for females and for adolescent and young adult groups.

Authors’ Conclusions. Interventions are associated with substantial reduction in ageism and should be part of an international strategy to improve perceptions of older people and the aging process. Additional research using more rigorous designs to examine the effects of interventions is strongly recommended.

Public Health Implications. Ageism has well-established negative effects on the physical and mental health of older people. Findings suggest that relatively low-cost, feasible strategies involving education and intergenerational contact can serve as the basis of effective interventions to reduce ageism. (Am J Public Health. 2019;109:e1–e9. doi:10.2105/AJPH.2019.305123)

See also Nelson, p. 1066.

PLAIN-LANGUAGE SUMMARY

Ageism is the stereotyping, prejudice, and discrimination against people on the basis of their age. Research has shown that ageism directed toward older adults has a negative impact on their health, well-being, and quality of health care received. The scope of ageism is expected to expand in the context of a growing aging population around the world. Despite the scope and health-related consequences of ageism against older adults, the relative effectiveness of common intervention strategies designed to reduce ageism has not been established. We sought to conduct a systematic review and meta-analysis examining the relative effectiveness of ageism interventions characterized by education, intergenerational contact, or both. Our findings showed that interventions significantly reduced ageism outcomes related to attitudes, knowledge, and comfort toward older adults. Interventions that combined elements of both education and intergenerational contact had the largest effect on people’s attitudes toward older adults. Furthermore, interventions had a stronger effect on females as well as adolescent and young adult age groups. This study suggests that relatively low-cost, feasible interventions should be adopted as a part of an international strategy to reduce ageism. Further investigation using rigorous intervention study designs is strongly recommended for future research.
Ageism, defined as stereotyping, prejudice, or discrimination toward people on the basis of age, is a mounting international concern with important health implications. A substantial and growing body of research shows that ageism toward older adults is highly prevalent across countries, and the scope of this problem is expected to grow with global population aging. Furthermore, compelling findings have emerged demonstrating that negative attitudes toward aging pose a significant risk to health and well-being in the later years. Adoption of widespread negative attitudes toward aging contributes to mortality risk, poor functional health, and slower recovery from illness. Holding negative perceptions of aging also predicts poor mental health.

Not only do pervasive ageist attitudes and stereotypes contribute to negative health outcomes, but ageism among health care professionals can also result in discriminatory practices that place older people at risk. Studies have found widespread negative attitudes toward older people and old age among physicians, medical students, and nurses. Such ageist attitudes can lead to practical consequences for older patients, as assumptions regarding functional and cognitive decline lead to more limited provision of medical information, withholding certain treatment options, and exclusion from clinical trials.

Ageist attitudes have also been found among mental health practitioners and trainees (such as assuming that symptoms such as depression are normal among the aged), which in turn may restrict access to treatments. Thus, age stereotyping and prejudice among health providers can affect the quality and quantity of care older people receive and in turn lead to negative health outcomes.

Ageism also promotes other forms of discrimination including the social exclusion of older persons from meaningful roles and relationships. The experience of social exclusion related to unfavorable stereotypes has been identified as a chronic stressor for older people that can compromise health. Age-related prejudices lead to discrimination and institutional norms based on stereotypes that limit the participation of older adults.

At an institutional level, ageist attitudes also inhibit the development of health policies that would benefit older individuals.

Given the extent of ageist attitudes and stereotypes and the negative consequences of ageism for health and quality of care, developing effective interventions to reduce ageism is a priority. Support for this view is provided by growing evidence that reducing ageism can promote positive health behaviors among older people. Thus, developing interventions to combat ageism is increasingly viewed as a critical component of healthy aging. Interventions include educating professionals and the general public, fostering contact between older individuals and young people (e.g., school-aged children, university students), and experimental attempts to change attitudes.

Despite this promise, the effectiveness of interventions to reduce or prevent ageist stereotypes, prejudice, or discrimination has not been established. To date, no systematic review and meta-analysis has been conducted, to our knowledge, that addresses the effectiveness of interventions across age groups to reduce ageism toward older adults. Although the extensive literature on ageism and health outcomes sheds light on the scope and impact of the problem, there is no clear guidance about how to reduce negative views of older adults through targeted interventions.

As part of a larger initiative coordinated by the World Health Organization (WHO) to understand and address the issue of ageism, we conducted a systematic review and meta-analysis of relevant experimental and quasi-experimental intervention studies to examine the relative effectiveness of major types of ageism interventions. On the basis of previous research, we categorized interventions into 3 types: educational interventions that provide instruction of some kind designed to reduce ageism, intergenerational contact interventions that feature an opportunity for contact between younger people and older people, and combined interventions that pair the 2 approaches.

METHODS

We conducted a systematic review and meta-analysis in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Eligible studies met the following inclusion criteria: (1) evaluated an intervention designed to reduce ageism, (2) examined at least 1 ageism outcome in relation to older adults, (3) used a design with a comparison group (randomized or non-randomized), and (4) were published after 1970, when the ageism concept was developed.

Literature Search Strategy and Selection Criteria

We searched the following electronic databases (academic, gray literature) up until December 2017 by using translations of a comprehensive “ageism” search strategy developed in consultation with information specialists: PubMed, PsycINFO, AgeLine, EBSICO, Embase, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Global Index Medicus, Database of Abstracts of Reviews of Effects (DARE), Epistemonikos, Cochrane Database of Systematic Reviews, Campbell Collaboration, PROSPERO, GreyLit, and OpenGrey. The search strategy combined key terms related to ageism, “age discrimination,” “age prejudice,” “age stereotype,” or “social exclusion” with terms related to “elder” or “older adults” (Figure A, available as a supplement to the online version of this article at http://www.ajph.org). We identified additional records by hand-searching reference lists of relevant review articles and the reference lists of the studies included in this meta-analysis. Following an initial phase of removing duplicates and completely irrelevant records, 2 independent reviewers (among C.S., M.W., and C.B.) screened records for...
potentially eligible titles and abstracts and subsequently reviewed full texts to determine inclusion in the meta-analysis. Disagreements were resolved with a third reviewer (D. B. or K. P.) via consensus. We used Covidence systematic review management software (Veritas Health Innovation Ltd, Melbourne, Australia) to facilitate the screening process. We assessed study eligibility against a systematic review and meta-analysis protocol registered with PROSPERO (ID: CRD42018088349).

Data Analysis

Extraction. Two reviewers (among C. S., M. W., and R. C.) independently extracted the following study-level data from records by using a common data collection spreadsheet, which was pilot-tested with an initial sample (n = 10) of records: publication year, country, intervention type and duration, research design, participant inclusion and exclusion criteria, sample size, and participant characteristics (e.g., age, gender, race/ethnicity, educational group). For each ageism outcome measure, we extracted mean and SD data for treatment and control groups. If SDs were not provided in the article or available after contacting authors (n = 15), we derived them by using other information provided in the article (i.e., means, Ns, t or F statistics). In some cases, it was necessary to assume equal SDs for control and intervention groups or for baseline and follow-up in the derivation.

Many studies had only 1 follow-up assessment point (n = 51), and the remaining studies (n = 12) varied greatly in the timing of subsequent follow-up assessments (ranging from several weeks to 5 years). For this reason, we used the first follow-up assessment (range = 1–104 weeks; mean = 15 weeks) for all studies in the analysis. We compared data collection sheets from independent reviewers on all data elements, and we resolved discrepancies through consensus.

Studies with multiple intervention arms. Several studies contained multiple intervention arms. We selected or combined intervention groups to create a single intervention group for each study. All cases of combined arms involved, for example, identical outcomes and protocols (timing of intervention and follow-up) and comparable goals, not requiring modeling of dependence between arms. We selected the original researchers’ “combined” intervention arm when more than 1 of the 3 intervention types were represented in a study. This selection rule aligned with the theoretical expectation that a combined intervention strategy would be more impactful than an approach involving only 1 mode of intervention.

Outcomes. We organized the ageism measures used across studies (Table A, available as a supplement to the online version of this article at http://www.ajph.org) into 5 outcome categories through research team consensus that reflect common categories of ageism found in the literature and represent both self-directed and other-directed dimensions of the construct. The meta-analysis examined 2 primary outcomes: attitudes toward aging, including aging stereotypes, perceptions, and prejudice toward older people, and knowledge on aging, including information and misconceptions on the aging process. We examined 3 additional secondary outcomes: comfort and types of behavioral interactions with older adults, and anxiety about one’s own aging process, and interest in working in the field of geriatrics or gerontology. If a study reported more than 1 measure for a given outcome category, we selected the measure most commonly used within the pool of included studies. We determined this by selecting the measure that was used most commonly across the studies that considered the outcome in question.

Risk of bias and quality of evidence assessments. Two reviewers (among C. S., M. W., and R. C.) independently appraised the risk of bias for individual intervention studies by using the Cochrane Risk of Bias Tool, which assesses studies as low or high risk for the following forms of bias: selection, performance, detection, attrition, reporting, and other. We resolved discrepancies between reviewers in assessing risk of bias through consensus within the study team. We used the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) tool to assess the quality of the body of evidence across studies for each ageism outcome.

Methods of analysis. We carried out meta-analyses by using statistical mixed models. The dependent variables were the standardized mean differences (SMDs) over time (baseline to postintervention) for control and for intervention (outcome mean differences divided by the SD of the difference).

The primary model included treatment (control vs intervention), time of assessment (a repeated measure: baseline vs first follow-up upon treatment completion) as fixed classification factors, the interaction between these factors, and studies as levels of a random classification factor. We specified an unstructured error. Random effects help to model heterogeneity among studies. We examined the effect of the intervention on study outcomes by the treatment multiplied by time interaction in this model. Results are reported in terms of differences of SMDs, denoted $d_{ij}^{t}$, because of the numerous measurement instruments and scale ranges used by the studies for each outcome.

We examined additional independent variables, including type of intervention (intergenerational contact-only, educational-only, combined intergenerational contact and education), educational age group (preschool or primary-school students, high-school students, university students), year of publication, country of study, randomized controlled trial versus quasi-randomized, mean age of study participants, participant percentage female, participant percentage White, and participant percentage African American. We added each of these variables to the primary model (as a fixed classification factor for categorical variables and as a covariate for quantitative variables; separate models for each variable) as well as its interaction with treatment and time. To examine whether, for example, specific study-level methodological characteristics moderated treatment effects—whether effects were stronger for or limited to certain levels of these characteristics—the focus was on the interaction with treatment, including examination of homogeneity of regressions for the covariates. These examinations of moderator variables were limited to the primary outcomes, attitudes, and knowledge because of the limited number of studies assessing the secondary outcomes. We examined a measure of intervention dosage—number of weeks—in a separate model in which we regressed outcomes on these variables for the intervention group only.

In this type of meta-analysis, it is clear that an assumption of studies as fixed (a single true
Effect size for all studies is inappropriate. True effect sizes will vary by studies owing not just to sampling error but also to differences in sample composition (e.g., age, ethnicity, education), methods of assessment and study protocol, variable definitions, overall study quality, and numerous other factors. We used mixed models in which we assumed studies to be random (sampled from a population of studies). We assumed effect sizes to differ by studies.

We examined the question of publication bias by constructing funnel plots with sample size plotted against SMD.33

RESULTS

The database and hand searches identified 29,702 total articles, and we identified 238 records for full-text review following removal of duplicates and irrelevant records. We excluded 174 full-text records for several reasons, such as studies lacking a comparison group, pre-post assessment, ageism outcome, and usable data for the purpose of meta-analysis. Exclusions resulted in 6334–96 studies eligible for meta-analysis with a total sample of 6124 participants (Figure 1). Included studies were published between 1976 and 2018. Interventions comprised intergenerational contact-only (33.3%), education-only (36.5%), and combined intergenerational contact and education (30.2%) programs with mean duration of 12.6 weeks (SD = 16.6). Studies included both experimental (8.0%) and quasi-experimental (92.0%) designs. Participants were mostly female (67.2%) and White (66.7%) with mean age 22.4 years (SD = 9.0) across preschool and primary-school (20.7%), high-school (15.9%), undergraduate (20.6%), and graduate or professional (36.5%) educational age groups. The most common ageism outcome category was attitudes toward aging (n = 53) followed by knowledge about aging (n = 19), comfort with older adults (n = 9), interest in working with older adults (n = 6), and anxiety about own aging (n = 5; see Table A for study characteristics).

Meta-analyses of the overall effect of ageism interventions for all outcomes are shown in Table 1 and for primary outcomes in Figures 2 and 3. Ageism interventions demonstrated a strongly significant effect on attitudes (d_D = 0.33; P < .001), knowledge (d_D = 0.42; P < .001), and comfort (d_D = 0.50; P < .001), but no significant effect
on anxiety ($d_{3} = 0.13; P = .33$) or working with older adults ($d_{3} = -0.09; P = .40$).

In the moderator analysis (Table B, available as a supplement to the online version of this article at http://www.ajph.org), each intervention type showed a strong effect on primary outcomes of attitudes (intergenerational-only: $d_{3} = 0.18; P = .026$; education-only: $d_{3} = .34; P < .001$; combined: $d_{3} = 0.43; P < .001$) and knowledge (intergenerational-only: $d_{3} = 0.53; P = .005$; education-only: $d_{3} = 0.41; P < .001$; combined: $d_{3} = 0.36; P < .08$). The combined and intergenerational contact-only intervention types demonstrated the strongest effects on the attitudes and knowledge outcomes, respectively. Gender was a significant moderating factor for attitudes ($d_{3} = 0.01; P = .009$) and knowledge ($d_{3} = 0.01; P < .001$), with interventions having a greater positive effect on females.

Ageism interventions had significant effects on both primary outcomes among high-school (attitudes: $d_{3} = 0.36; P < .001$; knowledge: $d_{3} = 0.50; P < .027$) and university-level (attitudes: $d_{3} = 0.39; P < .001$; knowledge: $d_{3} = 0.42; P < .001$) educational age groups. The relation between intervention dosage (number of weeks) and the attitudes outcome was positive but not significant ($P = .09$); intervention dosage was not related to knowledge ($P = .69$). There was no significant difference between ageism intervention studies using randomized controlled trials versus non–randomized controlled trial designs on the attitudes outcome. There were too few randomized controlled trials with data on the knowledge outcome to examine this effect. There was also no significant difference on primary outcomes between intervention studies from the United States versus non-US countries.

In general, studies included in this meta-analysis were found to be at high risk of bias according to the Cochrane Risk of Bias Tool (Table C and Figure B, available as supplements to the online version of this article at http://www.ajph.org). The majority of studies used a quasi-experimental design and, therefore, demonstrated shortcomings related to randomization, allocation concealment, and blinding of participants, personnel, and outcome assessors. Using the GRADE tool, we rated the quality of evidence supporting each outcome as low–moderate, largely downgraded because of the limitations in study design (Table D, available as a supplement to the online version of this article at http://www.ajph.org).

Although we would use a mixed model in the analysis regardless of the I$^2$, the I$^2$ values were 78.09 for attitudes and 81.11 for knowledge. The funnel plots for attitudes, knowledge, comfort, and anxiety outcomes showed no clustering of studies in the lower–right portion of the funnel that would indicate lack of publication of smaller or nonsignificant studies; the work outcome showed some evidence of bias (Figures C and D, available as supplements to the online version of this article at http://www.ajph.org).

**DISCUSSION**

Ageism, in the forms of stereotyping, prejudice, and discrimination toward people on the basis of age, has well-established negative effects on the physical and mental health of older people. However, global health strategies have not considered ageism as a modifiable risk factor. This situation is changing as the WHO has identified reducing ageism as a key target for improving human health.\(^23\) Although numerous interventions have addressed ageism, the overall effectiveness of such programs is unknown.\(^24\) To fill this knowledge gap, we completed the first meta-analysis, to our knowledge, of interventions designed to reduce ageism toward older people.

Our study provides a comprehensive systematic review and meta-analysis of available experimental and quasi-experimental ageism trials. In this meta-analysis, interventions significantly reduced levels of self-reported ageism among treatment participants versus controls. The size of these proportional reductions was broadly consistent across 3 intervention types, indicating that education, intergenerational contact, and combined programs provide broadly generalizable benefits. The data also suggest that interventions to reduce ageism are particularly effective among females and among adolescent and younger adult educational groups.

This study has several limitations. Given the nature of the available evidence, we were unable to rely primarily on randomized controlled studies. In the meta-analysis, 5 of the studies were randomized controlled trials and 58 employed quasi-experimental designs. Our approach was consistent with a general consensus in the field that inclusion of quasi-experimental studies is justified when more rigorous trials are lacking. As has been recommended,\(^27\) we excluded the weakest designs (including observational studies and single-group before-and-after studies) and only included studies that employed an analysis of a treatment and a comparison group with pre and post assessments on each group. The inclusion of non–randomized controlled trials that used comparison group designs is justified because it allows us to address outcomes from pragmatic implementations of ageism interventions that have not been sufficiently studied in randomized controlled trials.\(^28\) Our analysis comparing studies using randomized controlled trial versus non–randomized controlled trial designs found no significant differences on the primary outcome (attitudes) with enough studies to conduct such an analysis. However, findings reported in this article should be interpreted with caution because of the

**TABLE 1.—Mixed Model Meta-Analyses of Ageism Interventions for Primary and Secondary Outcomes: Worldwide, 1976–2018**

<table>
<thead>
<tr>
<th>Ageism Outcome</th>
<th>No. of Studies</th>
<th>No. of Participants</th>
<th>Effect Size, $d_{3}$ (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitudes toward aging</td>
<td>53</td>
<td>2404</td>
<td>2788</td>
</tr>
<tr>
<td>Knowledge on aging</td>
<td>19</td>
<td>818</td>
<td>756</td>
</tr>
<tr>
<td>Comfort with older adults</td>
<td>9</td>
<td>286</td>
<td>348</td>
</tr>
<tr>
<td>Anxiety about own aging</td>
<td>5</td>
<td>217</td>
<td>267</td>
</tr>
<tr>
<td>Working with older adults</td>
<td>6</td>
<td>388</td>
<td>375</td>
</tr>
</tbody>
</table>

Note. CI = confidence interval; $d_{3} =$ differences of standardized mean differences.
methodological limitations of the studies included. This observation points to the need for future studies to employ randomized controlled designs.

Our review also uncovered 2 important gaps in the ageism intervention literature. First, the majority of ageism intervention studies were from the United States, which may contribute to location bias; future research is necessary in other contexts throughout the world to understand whether the effect of certain interventions varies across different cultures and age-related social norms. Second, studies that examined the effect of ageism interventions among older adults themselves were lacking. Such research is critical given evidence of internalized ageism among older adults and their implicit preferences for younger adults.7

The most important implication of this meta-analysis, however, is the encouraging potential for interventions to reduce ageist stereotyping and prejudice.

Note. CI = confidence interval; dD = differences of standardized mean differences; wt = weight. In 2b, the 4 rightmost columns show, in order, dD for each study (which is dD), the lower confidence limit, the upper confidence limit, and the weight given to each study in the pooled analysis.

FIGURE 2—Examination of Overall Effect of Ageism Interventions on Primary Attitudes Outcome: Baseline to Posttreatment
Furthermore, most of the interventions included in this review were small-scale, low-cost programs. Positive effects were found in intervention over comparison groups in most studies, and negative effects of interventions were rare. Interventions that included both educational and intergenerational contact components demonstrated particularly strong effects, especially for combating negative attitudes toward aging, suggesting that such combined programs should be a high priority for rigorous testing and dissemination. Furthermore, given that ageism constitutes a global crisis, interventions must be developed that are adapted for different national and cultural contexts. Our findings suggest that intervention research will lead to substantial progress in combating ageism and, in turn, improving the health and well-being of older people.

CONFLICTS OF INTEREST

The authors have no conflicts of interest to report.

HUMAN PARTICIPANT PROTECTION

Institutional review board approval was not needed because human participants were not involved.

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