



## Research article

# Nursing undergraduates' ageism and attitudes toward dementia: Serial multiple mediating effects of person-centered care and compassion – A cross-sectional survey

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## ABSTRACT

**Background:** Although ageism has a strong relationship with attitudes toward dementia, no study has confirmed how person-centered care and compassion mediate the relationship between nursing students' ageism and attitudes toward dementia.

**Objectives:** This study aimed to examine the mediating effects of person-centered care competency and compassion competency on ageism and attitudes toward dementia among nursing undergraduates.

**Participants:** Participants were 295 undergraduate nursing students from four universities.

**Methods:** A descriptive cross-sectional electronic survey was conducted, involving the selection of four Korean nursing schools for the study. Data was obtained via an online survey conducted from March to July 2022. Data were analyzed with Pearson's correlations, and multi-mediating effects using the PROCESS Macro for software, utilizing bootstrap techniques.

**Results:** Attitudes toward dementia was correlated with ageism ( $r = -0.386, p < 0.001$ ), person-centered care ( $r = 0.422, p < 0.001$ ), and compassion competency ( $r = 0.457, p < 0.001$ ). The total effect ( $\beta = -0.326, p < 0.001$ ) and direct effect ( $\beta = -0.243, p < 0.001$ ) of ageism on attitudes toward dementia were significant. Ageism does not have a direct effect on compassion competency (Std. estimate =  $-0.0213$ , CI:  $-0.0518 \sim -0.0048$ ). However, person-centered care and compassion competency had multiple serial mediating effects on the relationship between ageism and attitudes toward dementia (Std. estimate =  $-0.0357$ , CI:  $-0.0624 \sim -0.0145$ ).

**Conclusions:** Person-centered care and compassion competency may mediate the association between ageism and attitudes toward dementia. Ageism was negatively associated with person-centered care and compassion competency, which in turn positively contributed to attitudes toward dementia. Therefore, an educational program that considers the interaction between generations and the context of older people must be applied to increase person-centered care and compassion competency.

## 1. Background

With the development of medical care, life expectancy and the older population has increased; aging has become more prevalent

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worldwide. Furthermore, prejudice, discrimination, and oppression toward older people started to appear as youths became unaware of older adults; thus, negative attitudes toward aging increased [1]. Ageism is pervasive among medical professionals, including doctors and nurses, as well as prospective medical professionals, such as medical and nursing students [2]. Ageism not only hurts older people's identities and quality of life but also causes separation and conflict between generations, impairing social cohesion [3]. Negative attitudes about older people among nursing undergraduates' fuel ageism and how they perceive older people with dementia [4]. Age discrimination among nursing students affected social distance for older adults with dementia [5]. Nurses with age discrimination attitudes may impact their interest in the older population and the quality of care they provide [6]. After having unpleasant encounters with older adults during clinical practice, most nursing students reported that they preferred working in general hospitals or places other than nursing homes for older adults [7].

The global dementia population is currently estimated at 55 million people, and projections suggest that this number could potentially triple by 2050, with approximately 139 million people being affected [8]. The management of dementia poses a considerable public health challenge owing to its profound effects on the quality of life of affected individuals. Caring for people with dementia requires person-centered care (PCC) where nurses have the knowledge and understand the uniqueness of the person [9]. The Alzheimer's Association listed empathetic communication and empathy as crucial for providing PCC in their 2018 guidelines for people with dementia [10]. Compassionate care involves providing selfless, behavior-oriented support that goes beyond empathy to enhance the individual's overall well-being [11]. When delivering high-quality nursing care to dementia patients, compassion is a key component [12]. Compassion competency serves as the foundation for establishing a therapeutic connection between the nurse and the patient, making it a crucial component for achieving success in the field of nursing.

In the medical field, PCC has not been achieved to the desired degree, and practices such as ignoring the symptoms of older patients because of ageism or them being unable to receive treatment at an appropriate time owing to low priorities are prevalent [2]. Ageism prevents compassion for older adults and demonstrates a negative correlation between ageism and compassion [13]. Furthermore, it may instill unfavorable stereotypes regarding people with dementia. Person-centered care rests on a foundation of compassion that cannot be overlooked [14]. PCC competency and compassion are essential competencies to care for people with dementia. Nursing students who were ageists demonstrated a positive effect on their attitude toward dementia as they interacted with older adults with dementia through communication [15]. After applying interventions that enhance compassion and PCC, attitudes toward older adults with dementia will become greater if students interact with the person individually, provide PCC for them, and have compassion [12].

Studies show that ageism has a strong relationship with attitudes toward dementia, suggesting that PCC and compassion impact attitudes toward dementia [3–7,9–12]. However, to the authors' knowledge, no study has confirmed how PCC and compassion mediate the relationship between nursing students' ageism and attitudes toward dementia. This study investigated the serial multiple mediating effects of PCC and compassion competency (CC) on the relationship between ageism and attitudes toward dementia in nursing college students. This research endeavor seeks to address this conspicuous gap in the existing literature and, in doing so, intends to make a substantive contribution to the field.

Therefore, this study aims to determine the mediating effects of PCC competency and CC on the relationship between attitudes toward dementia and ageism. Based on the findings of previous literature, the following hypotheses were proposed.

**Hypothesis 1.** Attitudes toward dementia will be correlated with ageism, person-centered care competency, and compassion competency.

**Hypothesis 2.** Person-centered care competency and compassion competency (mediating variables) will influence attitudes toward dementia (dependent variable).

**Hypothesis 3.** Ageism (independent variable) will influence attitudes toward dementia (dependent variable).

**Hypothesis 4.** Person-centered care and compassion competency will mediate the relationship between ageism and attitudes toward dementia.

## 2. Methods

### 2.1. Study design and participants

A descriptive cross-sectional study was designed to examine the relationship between the variables and the mediating effects of PCC competency and CC. Participants were 295 Korean nursing students from four nursing schools, chosen using convenience sampling. The study was conducted from March to July 2022. In Korea, a nursing college accreditation system has been instituted, leading to the standardization of nursing education and delivering consistent instruction to nursing students.

The G\* power 3.1.9.7 software program calculated the required sample size. The sample size of 184 was determined to be appropriate for the study, based on a medium effect size of 0.15, a power of 95.0 %, a significance level of 0.05 in multiple regression analysis, and 12 predictors (i.e., nine demographic characteristics, ageism, PCC competency, and CC). Nursing students were eligible to participate in this study if they had completed at least five semesters in a Bachelor of Science in nursing program, understood the research's aim, and had voluntarily given their consent to participate. In addition, this study's report follows the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) reporting guidelines.

## 2.2. Procedure

Data was collected using online questionnaires via the “Naver Form” survey platform. The recruitment process involved sharing recruitment documents and online survey links through social networking services used by nursing students to communicate and form online networks. Prospective participants were fully informed of the study’s details and provided informed consent through an online questionnaire. The submission of their questionnaire form was considered consent. To prevent duplication, the IP addresses of all respondents were verified upon receipt of their online questionnaires. Of the 298 total respondents, excluding 3 who declined the use of their data, the responses from 295 were included in the analysis of the hypothetical model tested in this study.

## 2.3. Measurements

Students’ demographic data, including age, gender, academic semester, religion, satisfaction with major, experience living with grandparents, experience with volunteer activity, participation in older adults’ care training course, and academic achievement in the previous semester, were collected. Four additional instruments were employed alongside the demographic questionnaire.

## 2.4. Attitudes toward dementia

The Dementia Attitudes Scale (DAS) developed by O’Connor and McFadden [16] is a 20-item tool designed to measure perceptions and emotions towards individuals with Alzheimer’s disease and related dementias. The DAS assesses both affective and behavioral (comfort subdomain) and cognitive (knowledge subdomain) components, with each item rated on a seven-point Likert scale from 1 (strongly disagree) to 7 (strongly agree). A higher score indicates a more favorable attitude toward dementia. Cronbach’s  $\alpha$  ranged from 0.78 to 0.83 in the DAS [16] and 0.78 in this study.

## 2.5. Ageism

The Ageism Scale developed by Kim [17] was used to evaluate college students’ level of ageism. This tool was developed in the context of Korean society, utilizing the ‘Aging Anxiety Scale,’ ‘Relating to Older People Evaluation,’ and ‘Fraboni Scale of Ageism [17].’ The sub-factors encompass perceptions related to older people, including anxiety about aging, attitudes towards physical changes, positive expectations about old age, as well as perceptions and attitudes towards older people, manifesting as biases, avoidance, extreme isolation from older people, and discriminatory behaviors towards older individuals. This tool consists of 21 items. Each item was measured on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Cronbach’s  $\alpha$  was found to be 0.69 in Kim’s [17] study and 0.76 in this study.

## 2.6. Person-centered care competency

PCC competency developed by Suhonen et al. [18] was assessed using the Individualized Care Scale-Nurse A version (ICS-A-Nurse). The ICS-A-Nurse evaluates nurses’ perceptions of individualized patient care and includes PCC elements such as needs, preferences, responsibility, and decision-making. The Korean-translated version of the tool by Park and Choi [19] was used comprising 17 items rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), with higher scores indicating higher PCC. Cronbach’s  $\alpha$  was found to be 0.69 in the original research and 0.90 in this study.

## 2.7. Compassion competency

The Compassion Competence Scale (CCS) developed by Lee and Seomun [20] was employed to assess nurses’ compassion competence levels. The CCS includes 17 items categorized into three domains: communication, sensitivity, and insight. Each item was measured on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), with higher scores reflecting greater compassionate competence. Cronbach’s  $\alpha$  was 0.87 both in the original research and this study.

## 2.8. Ethical considerations

Approval for this study was granted by the Institutional Review Committee (IRB approval no. GIRB-A22-Y-0012) of Gyeongsang National University in Jinju city, South Korea. All participants in this study provided their informed consent voluntarily, and they were aware of their right to decline participation and withdraw at any time, receiving a reward for their engagement (approximately \$5). To ensure confidentiality, all data and related files were securely stored on a password-protected computer that only the authors had access to.

Conducted in strict compliance with the principles outlined in the Declaration of Helsinki, this study received formal approval from the relevant institutional review board. Information pertaining to IRB clearance, as well as the authors’ contact details, was readily available on the survey’s initial page. All participants complete the survey after acquainting themselves with the introductory content on the initial page. This content outlined the study’s objectives, data collection procedures, confidentiality measures, guarantees of anonymity, and the freedom to withdraw from participation without incurring any adverse consequences. An ‘I agree’ checkbox appeared on the first survey page, signifying participants’ voluntary commitment.

## 2.9. Data analysis

Statistical analyses were conducted using IBM SPSS/WIN version 27.0. Descriptive statistics (number, percentage, means and standard deviations) were calculated for the study variables. Participants' characteristics, ageism, PCC competency, CC, and attitudes toward dementia were analyzed using descriptive analysis. The independent *t*-test and ANOVA were employed to examine the differences in attitudes toward dementia. Pearson's *r* bivariate correlations were employed to assess associations among the variables. For all statistical procedures,  $p < 0.05$  was deemed significant. Correlations among ageism, PCC competency, CC, and attitudes toward dementia were analyzed using correlation analyses. All variables in the study underwent Cronbach's  $\alpha$  reliability analyses.

The study employed a serial multiple mediation model 6 using the PROCESS macro for SPSS version 4 developed by Hayes [21] to examine the mediating effects of PCC competency and CC on the relationship between nursing students' age and their attitudes toward dementia. Following the guidelines by Hayes and Rockwood [22], 5000 bootstrap samples were analyzed, and the indirect effect estimate was generated with a 95 % confidence interval (CI). The mediating variable was regarded as statistically significant if the CI excluded zero and had a *p*-value  $< 0.05$ . The results of the study imply that the suggested mediating variable influenced the relationship between the independent and dependent variables.

## 3. Results

### 3.1. Participants' characteristics and differences in attitudes toward dementia

Table 1 exhibits the demographic characteristics of the participants and their discrepancies in attitudes toward dementia. A total of 295 nursing students participated (242 females [82.0 %]; 53 males [18.0 %]). The study subjects were between 20 and 53 years old, with the 22–23 age range comprising 45.8 % of the sample, with the average age being 22.79 years. Among the participants, 159 were fourth graders (53.9 %). Regarding religion, 205 (69.5 %) said "no"; 159 (53.9 %) said "no" to experience living with grandparents; 253 (85.8 %) said "yes" to having experience in volunteering; and 177 (60.0 %) answered "yes" to the experience of participating. As for their satisfaction with their major, 69 (23.4 %) answered "very satisfied," 153 (51.9 %) answered "satisfied," and 131 (44.4 %) answered "3.5–3.99" for academic achievement (Table 1).

The students with experience in a nursing home volunteering or volunteering with older people scored  $4.95 \pm 0.53$ , which was significantly higher than the  $4.69 \pm 0.56$  of those without experience in volunteering ( $t = 2.924, p = 0.004$ ). The degree of attitude toward dementia of the students who selected "very high" in satisfaction with major was  $5.13 \pm 0.56$ , which was significantly higher than that of the students who selected "satisfied"  $4.92 \pm 0.52$  and "less than average"  $4.71 \pm 0.50$  ( $F = 10.817, p < 0.001$ ).

### 3.2. Level of ageism, person-centered care competency, compassion competency, and attitudes toward dementia

The average overall ageism score of the study participants was  $2.52 \pm 0.45$ . Among the sub-domains, "changes in appearance during aging" were the highest at  $3.19 \pm 0.96$ , followed by "aging anxiety" at  $2.99 \pm 0.87$ , and "aging positive" at  $2.60 \pm 0.72$ . The overall score of CC was  $4.05 \pm 0.48$  on average, and among the sub-domains, sensitivity was the highest at  $4.33 \pm 0.54$ ,

**Table 1**  
Differences in attitude toward dementia according to characteristics (N = 295).

Characteristics	Categories	n (%)	Attitude toward dementia	
			Mean $\pm$ SD	t/F(p)
Gender	Female	242 (82.0)	4.91 $\pm$ 0.54	−0.369 (0.713)
	Male	53 (18.0)	4.94 $\pm$ 0.56	
College year	3rd	136 (46.1)	4.95 $\pm$ 0.57	−0.913 (0.362)
	4th	159 (53.9)	4.90 $\pm$ 0.53	
Age (years)	$\leq 21$	98 (33.2)	4.90 $\pm$ 0.56	0.308 (0.735)
	22–23	135 (45.8)	4.94 $\pm$ 0.52	
	$\geq 24$	62 (21.0)	4.89 $\pm$ 0.55	
Mean $\pm$ SD = 22.79 $\pm$ 3.31				
Religion	Yes	90 (30.5)	4.94 $\pm$ 0.40	0.643 (0.521)
	None	205 (69.5)	4.92 $\pm$ 0.37	
Experience living with grandparents	Yes	136 (46.1)	4.92 $\pm$ 0.57	−0.070 (0.944)
	No	159 (53.9)	4.91 $\pm$ 0.51	
Experience with volunteer activity	Yes	253 (85.8)	4.95 $\pm$ 0.53	<b>2.924(0.004)</b>
	No	42 (14.2)	4.69 $\pm$ 0.56	
Participation in older people training course	Yes	177 (60.0)	4.97 $\pm$ 0.55	<b>2.032(0.043)</b>
	No	118 (40.0)	4.84 $\pm$ 0.52	
Major satisfaction	Very satisfied	69 (23.4)	5.13 $\pm$ 0.56	<b>10.817(0.000) c &lt; b &lt; a</b>
	Satisfied	153 (51.9)	4.92 $\pm$ 0.52	
	Unsatisfied	73 (24.7)	4.72 $\pm$ 0.50	
Academic achievement (Max 4.5)	4.0 $\leq$	76 (25.8)	4.98 $\pm$ 0.52	0.700 (0.497)
	3.5–3.99	131 (44.4)	4.90 $\pm$ 0.57	
	3.49 $\geq$	88 (29.8)	4.88 $\pm$ 0.52	

communication at  $4.10 \pm 0.56$ , and insight at  $3.63 \pm 0.68$ . The overall score of the PCC competency was  $3.85 \pm 0.55$  on average. Among the sub-domains, decision-making control had the highest score of  $3.93 \pm 0.58$ , followed by the clinical situation at  $3.93 \pm 0.59$ , and personal life situation at  $3.61 \pm 0.78$ . The overall score for attitudes toward older adults with dementia was  $4.91 \pm 0.54$  on average; the cognitive aspect was the highest at  $5.44 \pm 0.59$ , and emotion and behavior were measured at  $4.39 \pm 0.46$  (Table 2).

### 3.3. Correlations among ageism, person-centered competency, compassion competency, and attitudes toward dementia

Results from the correlation analysis indicated a significant negative correlation between ageism and attitude toward dementia ( $r = -0.386, p < 0.001$ ), positive correlation between the participants' attitudes toward with dementia and their PCC competency ( $r = 0.422, p < .001$ ), and CC ( $r = 0.457, p < 0.001$ ). Ageism and PCC competency ( $r = -0.206, p < .001$ ), ageism and CC ( $r = -0.201, p < .001$ ) were negatively correlated (Table 3).

### 3.4. Regression coefficients and model summary information for the serial multiple mediator model

Verification of the serial multiple mediating effects of PCC competency and CC in the relationship between ageism and attitudes toward older adults with dementia was performed using bootstrapping and Model 6 of the PROCESS macro proposed by Hayes and Rockwood [22] (see Fig. 1). Results of the analysis are presented in Tables 4 and 5 and Fig. 2.

As shown in Fig. 2, the total effect ( $\beta = -0.499, p < 0.001$ ) of ageism on attitudes toward dementia was significant at Level 1. The direct ageism effects on PCC competency ( $\beta = -0.247, SE = 0.068, p < 0.001$ ) were significant and not insignificant on CC ( $\beta = -0.080, SE = 0.049, p = .105$ ), respectively. Additionally, the direct effect of PCC competency, as the first mediation variable, on the second mediation variable of CC was significant ( $\beta = 0.544, SE = 0.041, p < 0.001$ ). This research reveals that the effects of PCC competency ( $\beta = 0.171, SE = 0.062, p = .003$ ) and CC ( $\beta = 0.316, SE = 0.069, p < 0.001$ ) on attitudes toward dementia were statistically significant. The inclusion of ageism and all other mediating variables in the equation led to a significant direct effect relationship between ageism and attitudes toward dementia ( $\beta = -0.347, SE = 0.059, p < 0.001$ ). This outcome suggests that the mediation variables functioned as mediators in the relationship between ageism and attitudes toward dementia. Furthermore, the model was significant ( $F_{3,291} = 45.529, p < 0.001$ ), explaining 31.9 % of the variance in attitudes toward dementia in Table 4.

For PCC competency and CC to be established as mediations, both the effect of independent variables on dependent variables and the effect of independent variables on mediation must be statistically significant. The introduction of mediation had the effect of decreasing the impact of independent variables on dependent variables [22,23]. The introduction of mediation had the effect of decreasing the impact of independent variables on dependent variables. The addition of PCC competency and CC to the effect of ageism on attitudes toward dementia ( $\beta = -0.499, p < 0.001$ ) resulted in a reduction of the effect of attitude toward older people with dementia ( $\beta = -0.347, p < 0.001$ ). It was found that these two variables mediated the relationship between ageism and attitudes toward dementia. The comparison of specific and indirect ageism effects on attitudes toward dementia levels through PCC competency and CC are included in Table 5.

The study examined the statistical significance of indirect effects within the tested model using 5000 bootstrap samples, with estimates taken at a 95 % CI. The bias-corrected and accelerated (BCa CI) results, presented in Table 5, showed that the total indirect effect of ageism through PCC competency and CC on attitudes toward dementia was statistically significant (point estimate =  $-0.0947$ ; 95 % BCa CI [ $-0.1478, -0.0454$ ]). Single mediation of PCC competency (point estimate =  $-0.0377$ ; 95 % BCa CI [ $-0.0766, -0.0091$ ]) and serial multiple mediations of PCC competency and CC (point estimate =  $-0.0357$ ; 95 % BCa CI [ $-0.0624, -0.0145$ ]) were statistically significant in relation to mediating indirect ageism effects on attitudes toward dementia. However, the mediating indirect

**Table 2**  
Degree of ageism, individualized care, compassion competence, and dementia attitudes (N = 295).

Variables	Range of scale	Mean $\pm$ SD
Ageism	1–5	2.52 $\pm$ 0.45
Aging anxiety		2.99 $\pm$ 0.87
Prejudice		2.32 $\pm$ 0.69
Avoidance		2.15 $\pm$ 0.72
Aging change in appearance		3.19 $\pm$ 0.96
Discriminatory behavior		2.12 $\pm$ 0.86
Positive aging		2.60 $\pm$ 0.72
Separation from the elderly		2.62 $\pm$ 0.93
Compassion Competency	1–5	4.05 $\pm$ 0.48
Communication		4.10 $\pm$ 0.56
Sensitivity		4.33 $\pm$ 0.54
Insight		3.63 $\pm$ 0.68
Person-centered care competency	1–5	3.85 $\pm$ 0.55
Clinical situations		3.93 $\pm$ 0.59
Personal life situations		3.61 $\pm$ 0.78
Decisional control		3.93 $\pm$ 0.58
Dementia Attitude	1–7	4.91 $\pm$ 0.54
Knowledge		5.44 $\pm$ 0.59
Comfort		4.39 $\pm$ 0.46

**Table 3**

Examine the degree and correlations among ageism, person-centered care competency, compassion competency, and attitude toward dementia (N = 295).

Variables	Ageism	Person-centered care competency	Compassion competency	Attitude toward dementia
	r(p)	r(p)	r(p)	r(p)
Ageism	1			
Person-centered care competency	-0.206 (<0.001)	1		
Compassion competency	-0.201 (<0.001)	0.630 (<0.001)	1	
Attitude toward dementia	-0.386 (<0.001)	0.422 (<0.001)	0.457 (<0.001)	1

**Table 4**

Regression coefficients and model summary information for the serial multiple mediator model (N = 295).

Antecedent		Consequent										
		M1(PCCC)			M2(CC)			Y (AD)				
		Coeff.	SE	p	Coeff.	SE	p	Coeff.	SE	p		
X (AS)	a <sub>1</sub>	-0.247	0.068	<0.001	a <sub>2</sub>	-0.080	0.049	0.105	c <sub>1</sub>	-0.347	0.059	<0.001
M1(PCCC)					d <sub>21</sub>	0.544	0.041	<0.001	b <sub>1</sub>	0.181	0.062	0.003
M2(CC)									b <sub>2</sub>	0.316	0.069	<0.001
Constant	iM <sub>1</sub>	4.476	0.176	<0.001	iM <sub>2</sub>	2.148	0.221	<0.001	i <sub>y</sub>	3.813	0.303	<0.001
		R <sup>2</sup> = 0.042				R <sup>2</sup> = 0.401				R <sup>2</sup> = 0.319		
		F (1,293) = 12.921				F (2,292) = 98.055				F (3,291) = 45.529		
		p = 0.004				p < 0.001				p < 0.001		

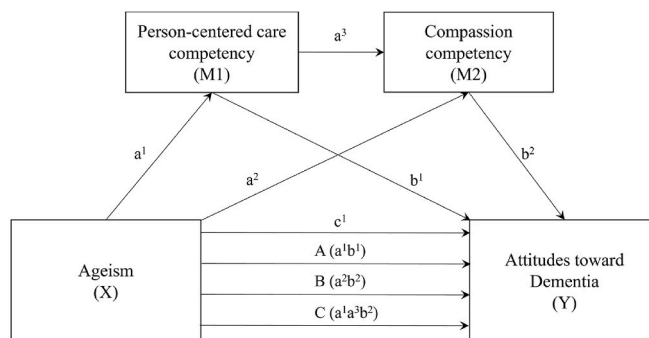
AS: ageism; PCCC: Person-centered care competency; CC: Compassion competency; AD: Attitude toward dementia; M1: first mediator; M2: second mediator; Source: calculated by authors by using Process in SPSS 27.0.

**Table 5**

Indirect effects (N = 295, Bootstrap samples = 5000).

Effect	Product of Coefficients		Bootstrapping 95 % BC Confidence Interval (CI)	
	Point Estimate	Boot SE	BootLL CI	BootUL CI
Total indirect effect of X on Y	-0.0947	0.0260	-0.1478	-0.0454
Indirect effect 1: X→M1→Y	-0.0377	0.0178	-0.0766	-0.0091
Indirect effect 2: X→M2→Y	-0.0213	0.0141	-0.0518	0.0048
Indirect effect 3: X→M1→M2→Y	-0.0357	0.0124	-0.0624	-0.0145

X: Ageism, M1: Person-centered care competency, M2: Compassion competency, Y: Attitude toward dementia.



Note. a<sup>1</sup> (direct effect)=regression coefficient for M1 in a model predicting M1 from X; a<sup>2</sup> (direct effect)=regression coefficient for X in a model predicting M2 from X; a<sup>3</sup> (direct effect)=regression coefficient for M1 in a model predicting M2 from M1; b<sup>1</sup> (direct effect)=regression coefficient for M1 in a model predicting Y from M1; b<sup>2</sup> (direct effect)=regression coefficient for M2 in a model predicting Y from M2; c<sub>1</sub> (direct effect)=regression coefficient for X in a model predicting Y from X; A=mediating effect of M1 between X and Y; B=mediating effect of M2 between X and Y; C=serial mediating effect of M1 and M2 between X and Y.

**Fig. 1.** Path diagram of the serial mediating effect.



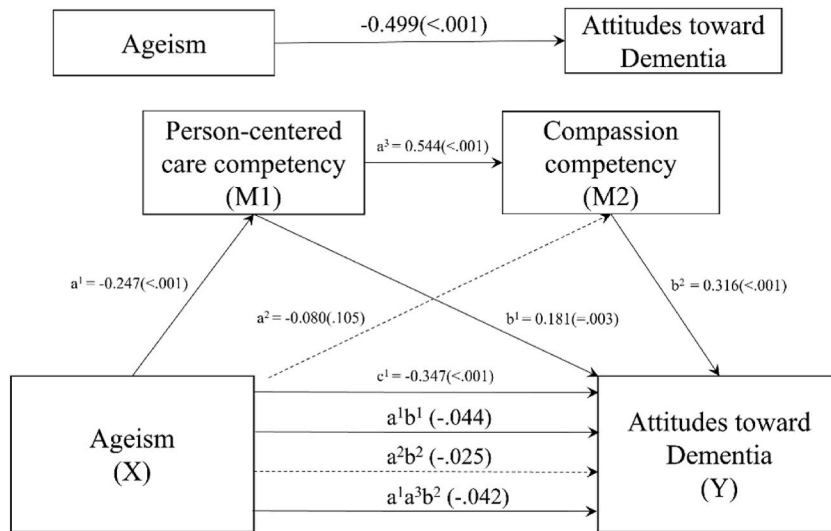


Fig. 2. Serial mediating effects of person-centered care competency and compassion competency between ageism and attitudes toward dementia.

ageism effects on attitudes toward dementia and mediation of CC (point estimate =  $-0.0213$ ; 95 % BCa CI  $[-0.0518, 0.0048]$ ) were not significant.

#### 4. Discussion

This study investigated the ageism effects on attitudes toward older people with dementia among Korean nursing students and examined the serial multiple mediating effects of PCC competency and CC on the relationship between ageism and attitudes toward dementia. Based on this study, we provide preliminary data for developing intergenerational interaction and context-oriented educational programs to lower the ageism of nursing students and increase their attitudes toward dementia.

In this study, satisfaction with the major ( $t = 10.817, p < 0.001$ ), experience with volunteer activities ( $t = 2.924, p = 0.004$ ), and participation in an older adult care training course ( $t = 2.032, p = 0.043$ ) showed significantly stronger attitudes toward dementia. This may be because participating in volunteer activities and training courses for older adults, where students interact directly, observe their behavior, and develop an understanding, led to more positive experiences and a relatively higher level of attitude about older adults than other students. Similarly, applying the older adults' program to nurses to improve their attitudes toward dementia also showed stronger attitudes toward dementia [24]. We posit that students' attitudes toward dementia have positively evolved through meticulous observation and intentional efforts to enhance contact opportunities. Higher satisfaction with their major was positively associated with active participation in clinical practice or programs offered by the major, and, consequently, a positive attitude toward dementia among students was observed [25].

In this study, the mediating effect of PCC competency was significant in the relationship between ageism and attitudes toward dementia. In other words, it is important to correct ageism in nursing students and improve their perception of older adults to make their attitudes toward dementia positive. Simultaneously, it could be predicted that attitudes toward dementia will improve if nursing students' PCC competency is strengthened. Even if ageism prevails socially or personally, it can positively change attitudes toward dementia by promoting PCC competency of nursing students.

The serial multiple mediation tests conducted in this study revealed that the serial multiple mediation of PCC competency and CC was found to be statistically significant in the relationship between ageism and nursing students' attitudes toward dementia. Brown et al. [26] found that strengthening nurses' expertise in PCC increased their communication and empathy skills, leading to a more favorable impact on their attitudes toward dementia [26]. In a systematic analysis of 28 papers on ageism, Kydd and Fleming [27] applied PCC to social value and compassion to eliminate negative perceptions related to the older generation, and their results were consistent with the findings of this study.

In this study, a single mediating effect of CC on the relationship between ageism and nursing students' attitudes toward dementia was found to be insignificant. However, nursing students who held unfavorable opinions about aging underwent simulation games or empathy skill training, such as meeting older adults during clinical practice, mentoring, and interviewing them, which helped them better understand older adults [28]. The findings of this study support previous research indicating that negative attitudes toward older adults can inhibit one's ability to feel compassion, as reflected in the inverse relationship observed between ageism and compassionate tendencies [13,29]. It appears that students with an ageist perspective can also improve their attitudes toward dementia by attending a compassion program.

Ageism and negative attitudes toward dementia can result from a lack of understanding toward older people [29]. It is important to recognize that ageism and attitudes toward dementia are interconnected. Given the increase in the aging population and the prevalence of chronic illnesses, many clients nurses encounter are older adults. To develop PCC competency, nurses require education that

provides a thorough understanding of the nursing context and interpersonal skills. Strategies such as simulation, real-life experience, and role modeling are effective in supporting the growth of PCC competency, including communication ability, professional attitude, compassion, person-centered communication, patient and team harmony, and improving PCC knowledge [30]. Additionally, it indicates that utilizing knowledge requires a creative, empirical, and reflective approach, which extends beyond logical and theoretical structuring [30]. Health professional students have been able to view aging positively by using aging simulation, research-based methodology, role models, and hands-on experience, which decreased ageism and increased empathy competency [31–33].

The concepts of compassion and empathy are not the same. Being a patient, experiencing the same emotions and suffering as the patient, and making an effort to comprehend them are all examples of empathy. Compassion, on the other hand, is an active response that seeks to understand another person's feelings, thoughts, and knowledge while maintaining a safe distance and acting benevolently to alleviate the other person's suffering [11]. Empathy can lead to encountering stressful situations due to the sharing of pain and emotions. Therefore, compassion is crucial for medical professionals and nursing students in the future.

For nursing students to improve their attitudes toward dementia, it is necessary to increase their PCC competency and CC. Hence, facilitating contact with older adults and encouraging interaction could improve intergenerational communication and make a difference in the ageist attitudes of nursing students. To provide PCC to older adults with dementia, they need to know about their personhood as well as have personal knowledge of dementia. Communication skills, one of the PCC competencies, are known to promote compassion, which is consistent with the extensive literature on providing care for older adults with dementia [12,15]. Slijvic et al. [34] and Loe [35] made digital storytelling of the life story that older adults wanted to share with others and exhibited and screened it. Youths who watched the exhibition reported that their negative attitude toward older adults changed positively after watching digital storytelling [34,35]. It is expected that a digital storytelling intervention considering the context of older adults could be an approach to promote intergenerational interaction and improve PCC competency and CC.

PCC has been incorporated into nursing higher education courses and used in nursing education in Sweden, Scotland, and Australia, but not in Korea [36]. Even though Korean nursing recognizes PCC as a vital component of the care offered by nurses, it is not included in the curriculum. The quality of nursing education in Korea is standardized and handled by the Korean Accreditation Board of Nursing Education. All nursing colleges are founded, run, and assessed in accordance with the program outcome-oriented curriculum, which is confirmed by the accrediting system. Improvements should be made to the educational system where changes to the curriculum incorporating PCC competency should be implemented.

Compassion and PCC presuppose a mutual relationship. To foster PCC and compassion capacity toward future healthcare providers, relationship-based situations as well as programs that combine theory, practice, and comparison should be implemented [37].

The ageism discussed in our study has primarily focused on negative stereotypes. However, there are also positive stereotypes associated with ageism, creating a complex prejudice [38,39]. It is crucial to differentiate between benevolent and positive attitudes and behaviors, as well as to distinguish how benevolent ageism differs from emphasized Person-Centered Care (PCC) and carefully examine their relationships. The notion that positive stereotypes or perceptions can influence the understanding of specific diseases or situations suggests that cultivating a positive perspective on adults and dementia has the potential to enhance patients' quality of life and positively impact the attitudes of healthcare professionals and nurses. Thus, a study to investigate the impact of positive biases on broader attitudes towards dementia and evaluate its potential for improvement would be significant. The limitations of this study are as follows: First, the study's findings may have limited generalizability due to the exclusive focus on nursing students from four Korean universities. The sample selection might not fully capture the diversity of attitudes toward dementia among other healthcare professionals or the broader population. Second, the cross-sectional nature of the study hinders the establishment of causal relationships between variables. Future research employing longitudinal designs is necessary to discern the dynamic interplay of ageism, PCC competency, CC, and attitudes toward dementia over time. Third, the study's contextual specificity to the Korean cultural and educational setting raises concerns about generalizability. Cultural variations in healthcare systems, educational structures, and attitudes toward aging in other regions may limit the applicability of the findings beyond the Korean context. Fourth, the study depends on self-report measures, potentially introducing response bias and social desirability. Participant responses may be influenced by a desire to portray themselves positively, impacting the accuracy of reported attitudes and competencies.

## 5. Conclusion

This study was conducted to test the serial multiple mediating effects of PCC competency and CC on the relationship between ageism and attitudes toward dementia among nursing undergraduates. The results showed that PCC competency and CC had a serial mediating effect on the relationship between ageism and attitudes toward dementia. To positively increase the attitudes of nursing students with negative ageism toward dementia, it would be effective to promote PCC competency and CC. If storytelling, role-play, and simulation focusing on intergenerational interaction are developed and applied considering the context of older adults, it might increase the PCC competency and CC of nursing students.

### Data availability statement

Data will be made available on request.

### CRediT authorship contribution statement

**HeeKyung Chang:** Writing – review & editing, Writing – original draft, Supervision, Project administration, Methodology, Funding



acquisition, Conceptualization. **JinYeong Ahn:** Writing – review & editing, Writing – original draft, Validation, Software, Project administration, Methodology, Investigation, Formal analysis, Data curation. **YoungJoo Do:** Writing – review & editing, Methodology, Investigation.

### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### Abbreviations

PCC	Person-centered care
CC	Compassion competency
SD	Standard deviation
SE	Standard error
CI	Confidence interval

### Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.heliyon.2024.e29941>.

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