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# A Study on Medical Management Students' Attitudes Towards the Elderly and Their Willingness to Pursue Careers in Geriatrics

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**Abstract**

Against the backdrop of rapid population ageing, this study examined whether geriatric medicine education can cultivate ageing-competent healthcare managers by focusing on medical management students. A total of 205 third-year students who completed a virtual simulation course on community hospital service optimization in ageing contexts were surveyed. Attitudes towards older adults, willingness to pursue careers in geriatric health management, and their influencing factors were analysed. The results showed that 70.7% of students demonstrated positive attitudes towards older adults, and 67.3% expressed willingness to work in geriatric health management. Female students, those reporting good relationships with older adults, greater attention to ageing-related information, and prior exposure to geriatric coursework scored significantly higher on both attitude and career intention measures. Evaluation scores of the virtual simulation course were positively associated with both outcomes, indicating that immersive, ageing-oriented simulation teaching can simultaneously enhance students' emotional attitudes and professional willingness. However, further analysis revealed a partial masking effect: increased career willingness was associated with heightened perceptions of responsibility and stress, which offset approximately 26% of the positive impact of the simulation course on attitudes towards older adults. This "high willingness–high pressure" mechanism suggests that while geriatric simulation education strengthens professional identification, it may also activate emotional strain related to perceived occupational burden. These findings indicate that geriatric medicine education for medical management students should extend beyond technical training and empathy induction to incorporate career guidance and stress-management components. Such integrated curricular design may better translate positive attitudes into sustainable career commitment, providing scalable, evidence-based strategies for cultivating compassionate and resilient healthcare managers in ageing societies.

**Keywords**: Ageing Contexts; Medical Management Students; Geriatric Medicine Education; Attitudes Towards Older Adults

## 1. Introduction

As China's population continues to age, healthcare professionals will increasingly be required to deliver services to a rapidly expanding elderly population. Medical students constitute the future healthcare workforce, and their attitudes toward older adults, as well as their willingness to pursue careers related to ageing, will play a critical role in determining the quality and efficiency of healthcare services for older adults.

Despite the growing demand for geriatric care, little is known about the attitudes and career intentions of medical management students—those who will plan, coordinate and evaluate older-adult services rather than deliver direct bedside care. Understanding and shaping their outlook is therefore essential for building an ageing-competent health-management workforce.

In response to these challenges, the present study designs a virtual simulation experimental course that optimizes community hospital services within the context of an ageing society. Focusing on medical management students who participate in this course, the study examines their attitudes toward older adults, their willingness to pursue careers in geriatric health management, and the factors influencing these outcomes. Furthermore, it explores the formative role of ageing-related virtual simulation practice courses in shaping students' attitudes and career intentions (Taylor, 2020), thereby providing evidence-based support for medical schools to refine teaching strategies and cultivate healthcare management professionals equipped with geriatric humanistic care competencies.

Against this background, the present study set out to answer four straightforward questions: (1) After finishing the virtual-simulation course, how positive are medical management students toward older adults and how willing are they to work in geriatric health management? (2) Which factors—such as gender, having taken gerontology classes, getting along well with older people, or paying attention to ageing news—make their attitudes or career willingness notably higher? (3) Does a better course rating boost attitudes directly and also indirectly by increasing career intention, and can this indirect path be "masked" when students suddenly feel the heavy responsibility of caring for older adults? (4) How big is this responsibility-pressure effect, and what does it imply for adding stress-management and career-support content to future geriatric courses?

## 2. Literature Review

Existing research has primarily focused on attitudes toward older adults and career intentions among medical students from clinical or caregiving perspectives. For example, Gendron (2016) examined attitudes toward older adults and related career aspirations, while Brown (1987) and Kim(2020) concentrated on medical students with specialized clinical competencies. Studies by

Yeom (2021), Zhang (2016), Jang (2019), and Lima-Silva (2021) mainly addressed geriatric healthcare and care services (Pang, 2025). However, comparatively little attention has been paid to medical management students—such as those majoring in health services administration or health services and management—particularly regarding their attitudes toward older adults and their willingness to pursue careers in geriatric health management (Liu, 2020).

In international research, Jung (2020) and Gunderson (2005) explored attitudes toward older adults and career intentions in health management–related fields, with a focus on nutrition and pharmacy students. Nevertheless, such studies remain limited in scope and depth. As China's ageing strategy shifts toward healthy and active ageing, disease-centered management alone is no longer sufficient to meet the complex health needs of older adults. The role of health management has therefore become increasingly prominent, suggesting that medical management students entering this field will play an essential role in providing health management services to an ageing population. As noted by Kang (2022), understanding this group's attitudes toward older adults and their willingness to engage in the geriatric health management industry has important practical implications for improving older adults' health outcomes and quality of life.

Both domestic and international studies have confirmed that geriatric education significantly influences attitudes toward older adults (Shao, 2021). Educational interventions that integrate knowledge acquisition with empathy cultivation have been shown to effectively and holistically improve attitudes among medical and medical-related students (Chen, 2021). In China, current intervention approaches primarily rely on community service–based models to implement blended educational interventions. However, these approaches are constrained by time and space, limiting their scalability and broader application.

To date, no study has simultaneously assessed Chinese medical management students' attitudes toward older adults and their willingness to enter geriatric health management after completing a geriatric-focused virtual-simulation course, identified the key predictors of these outcomes within this population, or tested whether stronger career intention might paradoxically weaken positive attitudes through responsibility-pressure concerns as predicted by occupational-stress theory; closing these gaps will furnish much-needed evidence for integrating stress-management and career-support modules into geriatric curricula and for scaling simulation-based training across health-management programmes nationwide.

## 3. Subjects and Methods

### 3.1. Subjects

In April 2024, third-year students majoring in Public Affairs Management at a medical university were selected via convenience sampling to participate in the course "Simulation Experiments for Optimising Community Hospital Services in an Ageing Context." All students voluntarily

participated in this survey. The questionnaire included introductory guidance, and all participants anonymously completed the survey after understanding its purpose and significance.

This survey distributed 220 questionnaires during classes in April 2024, with 214 recovered on-site, achieving a 97.3% response rate. After excluding 9 invalid questionnaires (those with ≥10% missing items, 80% consecutive identical scores, or logical contradictions), 205 valid questionnaires remained, achieving a 93.2% response rate that met the sample size requirements for subsequent regression analysis.

Invalid questionnaires were excluded based on the following criteria: 1. ≥10% missing items in the entire scale; 2. ≥80% consecutive items assigned the same score (classified as "straight-line response"); 3. Logical inconsistencies (e.g., selecting "never lived with elderly" while reporting "daily care for the elderly"); 4. Response times exceeding 120 seconds or deviating beyond 2 standard deviations.

### 3.2. Method

The survey comprised two sections: a self-designed questionnaire and an elderly attitudes survey questionnaire.

#### 3.2.1. General Background Information

General background information encompassed basic demographic characteristics, educational background, life experiences,and career aspirations.Basic demographic characteristics encompass gender,household registration status,and whether the respondent is an only child. Educational background includes whether the respondent has studied geriatric courses and whether they have undertaken internships related to elderly health management. Life experiences cover family attitudes towards the elderly, whether the respondent has lived with elderly individuals,their personal relationship with the elderly,whether they have experience caring for the elderly,whether they follow information related to the elderly,and whether they have participated in elderly-related voluntary activities.Employment intention refers to whether the respondent is willing to engage in elderly health management work after graduation.

#### 3.2.2. Effectiveness Evaluation of Management Virtual Simulation Experiments Set Against an Ageing Society Context

Banos (2012) and Castilla (2013) conducted effectiveness Evaluation of management-oriented virtual simulation experiment courses. Assessment of such courses set against an ageing society context encompasses: stimulating interest in the discipline; enhancing specialised health management knowledge; improving health management techniques for older adults; strengthening care for the elderly; bolstering interpersonal skills with older adults; and increasing aspirations to pursue careers in health management.The evaluation employs a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The minimum total score is 6, the maximum is 30, with 18 as the midpoint. Scores above the midpoint indicate a positive evaluation of the virtual simulation course,

scores below the midpoint indicate a negative evaluation, and scores at the midpoint indicate a neutral evaluation.

### 3.2.3. Attitudes Towards Older Adults

The Attitude Towards Older Persons Questionnaire employed the University of California, Los Angeles (UCLA) Attitude Towards Older Persons Scale Ying (2013). This 14-item scale utilised a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Negative items were reverse-scored, yielding a total score ranging from 14 to 70 points, with 42 points as the midpoint. Scores above the midpoint indicated a more positive attitude towards older persons,Scores below the midpoint indicate a negative attitude towards the elderly, while scores at the midpoint indicate a neutral attitude. The Cronbach's alpha coefficient for this scale is 0.76, a level consistent with the $\alpha$ = 0.74–0.78 previously reported among Chinese university samples.

To further verify the structural validity of this published instrument, we conducted confirmatory factor analysis (CFA) on the 14-item Chinese UCLA-GAS within the same sample. Maximum-likelihood estimation in AMOS 26 yielded an acceptable four-factor solution (social, sympathy, medical, resource): $\chi^2/df = 1.96$, CFI = 0.93, TLI = 0.91, RMSEA = 0.049 (90 % CI 0.032–0.065), SRMR = 0.042, with all standardized loadings above 0.45 ($p < 0.001$). These results align with the preceding Cronbach's $\alpha$ evidence and jointly support the scale's reliability and factorial validity for use in the present study.

External validity is further supported by Cheng et al. (2017), who found the Chinese UCLA-GAS to correlate positively with the Kogan Attitudes Toward Older People scale (KAOP) ($r = 0.30–0.63$, $P < 0.01$) and to load on four factors (social, sympathy, medical, resource) explaining 64 % of the variance (KMO = 0.76). In the same study the total score yielded a Cronbach's $\alpha$ of 0.754 and a 3-week test-retest reliability of 0.75–0.97, indicating that the Chinese version possesses satisfactory reliability and validity for the present study.

### 3.2.4. Statistical Methods

To address the three research questions, we applied a sequential set of statistical techniques.First, drawing on Altman's (1990) and Cumming's (2013) emphasis on summary metrics and precision, we computed descriptive statistics (means, standard deviations and 95 % CIs) for the UCLA Attitude Towards Older Persons total score and for the binary career-intention item to establish baseline levels.

Second, following Cohen's (1988) power framework and Kelley's (2012) effect-size guidelines, independent-samples t-tests, one-way ANOVA and Pearson correlations (with Cohen's d, $\eta^2$ or r) were used to identify significant predictors of these outcomes.

Third, hierarchical multiple regression—with VIF and tolerance diagnostics recommended by Hair et al. (2019)and O'brien (2007)—modelled the direct and masked effects of the virtual-simulation course on attitudes, while binary logistic regression employing the Hosmer-Lemeshow test and

Nagelkerke $R^2$ (Hosmer et al., 2013; Nagelkerke, 1991) estimated the probability of geriatric-health-management career willingness.

Finally, consistent with Preacher's (2008) and Hayes's (2018) mediation procedures, bias-corrected bootstrapping (5,000 samples) quantified the indirect pathway to determine whether the "high-willingness–high-pressure" mechanism significantly counteracts the course's positive influence.

### 3.2.5. Regression Variable Explanation

Hierarchical regression analysis of medical management students' attitudes toward the elderly, with elderly attitudes as the dependent variable, incorporated statistically significant variables from univariate analysis into the hierarchical regression method. The assigned values are shown in table 1.

**Table1. Attitude Scores Towards Elderly Individuals Among Medical Management Students**

| Variable | | Attribution and Value Range |
|---|---|---|
| Dependent Variable | Attitude Towards the Elderly | 14–70 (higher values indicate more positive attitudes towards the elderly) |
| Independent Variable | Gender | 1=Male, 2=Female |
| | Relationship with the Elderly | 1=Good, 2=Average, 3=Poor |
| | Have you participated in volunteer activities related to the elderly? | 1=Yes, 2=No |
| | Do you follow information related to the elderly? | 1=Yes, 2=No |
| | Virtual Simulation Course Evaluation | Enter original value |
| | Intention to pursue a career in elderly health management | 0=Unwilling, 1=Willing |

Multivariate analysis of medical management students 'career intentions. The dependent variable was medical management students' willingness to engage in geriatric health management. Variables with statistical significance from univariate analysis were included in the binary logistic regression equation, with assigned values as shown in table 2.

**Table2. Assignment Table for Medical Management Students' Willingness to Pursue Careers in Elderly Health Management**

| Variable | | Assignment and Range of Values |
|---|---|---|
| Dependent Variable | Willingness to Pursue a Career in Elderly Health Management | 0 = Unwilling, 1 = Willing |
| Independent Variable | Whether Enrolled in Gerontology Course | 1=Yes, 2=No |
| | Relationship with the Elderly | 1=Good, 2=Fair, 3=Poor |
| | Participation in elderly-related voluntary activities | 1=Yes, 2=No |
| | Have you participated in volunteer activities related to the elderly? | 1=Yes, 2=No |
| | Do you follow information related to the elderly? | 1=Yes, 2=No |
| | Virtual simulation course evaluation | Enter original value |
| | Attitudes towards the elderly | Enter original value |

## 4. Results

### 4.1. General Characteristics of Study Participants

The basic demographic characteristics of the subjects were as follows: 82 males (40%) and 123 females (60%); 69 subjects (33.7%) held urban household registration, while 136 subjects (66.3%) held rural household registration; 88 subjects (42.9%) were only children,and 117 subjects (57.1%) were non-only children.Regarding educational background, only 27 participants (13.2%) had taken courses on gerontology, and merely 34 (16.6%) possessed relevant practical experience in elderly health management. In terms of life experiences, the majority of respondents (184, 89.8%) reported that their families held favourable attitudes towards the elderly,178 (86.8%) had cohabited with elderly individuals, 168 (82%) maintained good relationships with them, 122 (59.5%) had caregiving experience, 112 (54.6%) participated in elderly-related volunteering, and 147 (71.7%) followed elderly-related information (Table 3).

**Table3. General Background Information of Survey Participants**

| Basic Demographic Characteristics | Frequency | Relative Frequency |
|---|---|---|
| Gender | | |
| Male | 82 | 40 |
| Female | 123 | 60 |
| Registered residence | | |
| Urban | 69 | 33.7 |
| Rural | 136 | 66.3 |
| Only child status | | |
| Yes | 88 | 42.9 |
| No | 117 | 57.1 |
| Whether Studied Gerontology Courses | | |
| Yes | 27 | 13.2 |
| No | 178 | 86.8 |
| Do you have relevant internship experience in elderly health management? | | |
| Yes | 34 | 16.6 |
| No | 171 | 83.4 |
| Life experiences | | |
| Family Attitudes Towards the Elderly | | |
| Good | 184 | 89.8 |
| Average | 21 | 10.2 |
| Poor | 0 | 0 |
| Have you ever lived with elderly people? | | |
| Yes | 178 | 86.8 |

| | | |
|---|---|---|
| No | 27 | 13.2 |
| Relationship with the elderly | | |
| Good | 168 | 82 |
| Average | 37 | 18 |
| Poor | 0 | 0 |
| Do you have experience caring for the elderly? | | |
| Yes | 122 | 59.5 |
| No | 83 | 40.5 |
| Have you participated in elderly volunteer activities? | | |
| Yes | 112 | 54.6 |
| No | 93 | 45.4 |
| Do you follow information related to the elderly? | | |
| Yes | 147 | 71.7 |
| No | 58 | 28.3 |

### 4.2. Univariate Analysis of Medical Management Students' Evaluations of Virtual Simulation Courses, Attitudes Towards the Elderly, and Career Intentions

#### 4.2.1. Evaluation of Virtual Simulation Courses Among Different Categories of Medical Management Students

Univariate analysis revealed significant differences ($P < 0.05$) in medical management students' evaluation scores across five variables: "family members' attitudes towards the elderly,""personal relationships with the elderly," "participation in elderly volunteer activities," "attention to elderly-related information," and "willingness to pursue geriatric health management after graduation."Specifically, students reporting a "positive" family attitude towards the elderly scored markedly higher than those with an "average" attitude; students with a "positive" personal relationship with the elderly scored higher than those with an "average" relationship; students who had participated in elderly volunteering scored significantly higher than non-participants; students who followed elderly-related information scored higher than those who did not; and students willing to pursue elderly health management careers scored markedly higher than those unwilling.The

findings indicate that the teaching effectiveness of virtual simulation courses is influenced not only by the technology itself but also by family environment, intergenerational interaction, practical experience, information engagement, and career motivation. The more positive these factors, the higher the students' evaluation of the virtual simulation course .

### 4.2.2. Attitude Scores Towards Older People Among Medical Management Students of Different Categories

Univariate analysis demonstrated significant differences in elderly attitude scores among medical management students according to gender, personal relationships with the elderly, participation in elderly-related volunteer activities, and engagement with elderly-related information. Specifically, female students exhibited higher attitude scores than their male counterparts. In terms of personal relationships with the elderly, students reporting good relationships achieved significantly higher scores than those reporting average relationships. Additionally, students who had participated in elderly-related volunteer activities scored significantly higher than those who had not participated (Table 4).

**Table 4. Elderly Attitude Scores Among Medical Management Students by Category**

| Variable | Virtual Simulation Course Evaluation Score | F/t Value | P-value | Attitude towards the elderly score | F/t value | P-value |
|---|---|---|---|---|---|---|
| Gender | | | | | | |
| Male | 24.82 ± 4.815 | -2.281 | 0.779 | 45.39 ± 7.303 | -3.078 | 0.002 |
| Female | 25±4.149 | | | 48.67 ± 7.573 | -3.078 | 0.002 |
| Registered residence | | | | | | |
| Urban | 25.19±4.647 | 0.603 | 0.547 | 47.51±8.350 | 0.202 | 0.840 |
| Rural | 24.79±4.307 | | | 47.28±7.253 | | |
| Whether an only child | | | | | | |
| Yes | 24.48±4.331 | -1.266 | 0.207 | 47.28±7.366 | -0.117 | 0.907 |
| No | 25.26±4.469 | | | 47.41±7.837 | | |
| Whether studying geriatric courses | | | | | | |
| Yes | 25.67±4.540 | 0.934 | 0.352 | 48.78±7.87 | 1.041 | 0.299 |

| | | | | | | |
|---|---|---|---|---|---|---|
| No | 24.81 ± 4.400 | | | 47.14±7.593 | | |
| Do you have relevant internship experience in elderly health management? | | | | | | |
| Yes | 25.47±4.581 | 0.785 | 0.433 | 46.26±9.093 | -0.914 | 0.362 |
| No | 24.82±4.389 | | | 47.57±7.303 | | |
| Family Attitude Towards the Elderly | | | | | | |
| Good | 25.29±4.319 | 13.112 | 0.000 | 47.61±7.807 | 2.070 | 0.152 |
| Average | 21.71±4.027 | | | 45.10±5.347 | | |
| Poor | 0 | | | 0 | | |
| Have you ever lived with elderly people? | | | | | | |
| Yes | 25.10±4.369 | 1.407 | 0.161 | 47.45 ± 7.933 | 0.611 | 0.544 |
| No | 23.81±4.650 | | | 46.74±5.171 | | |
| Relationship with the elderly | | | | | | |
| Good | 25.56±4.152 | 20.968 | 0.000 | 48.11±7.945 | 9.572 | 0.002 |
| Average | 22.05±4.497 | | | 43.92±4.621 | | |
| Poor | 0 | | | 0 | | |
| Experience in caring for the elderly | | | | | | |
| Yes | 24.94±4.476 | 0.062 | 0.951 | 46.89 ± 7.823 | -1.054 | 0.293 |
| No | 24.90±4.355 | | | 48.04±7.304 | | |
| Participation in elderly volunteer activities | | | | | | |
| Yes | 25.63±4.189 | 2.549 | 0.012 | 48.40±8.192 | 2.176 | 0.031 |
| No | 24.08±4.555 | | | 46.10±6.697 | | |
| Attention to elderly-related information | | | | | | |
| Yes | 25.56±4.286 | 3.336 | 0.001 | 48.10±8.246 | 2.671 | 0.008 |
| No | 23.33 ± 4.375 | | | 45.48±5.352 | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Willingness to engage in elderly health management after graduation | | | | | | |
| Yes | 25.86 ± 4.108 | 4.558 | 0.000 | 46.96 ± 8.292 | 1.204 | 0.230 |
| No | 23.00±4.435 | | | 48.18 ± 5.977 | | |

### 4.2.3. Correlation Analysis between Virtual Simulation Course Evaluation and Elderly Attitudes

A Pearson product-moment correlation analysis was conducted to examine the linear relationship between "virtual simulation course evaluation" and "attitudes toward the elderly" as continuous variables. The results showed a correlation coefficient of r = 0.180 (P = 0.010, <0.05), indicating a statistically significant positive correlation, albeit with a relatively weak strength. Specifically, higher course scores were associated with more positive attitudes toward the elderly among students, preliminarily confirming that virtual simulation teaching has a statistically significant positive effect on improving attitudes toward the elderly.

Since r = 0.18 only accounts for approximately 3.2% of the common variance ($r^2 = 0.032$), this suggests that while course experience can enhance attitudes, there are still numerous other factors requiring further investigation. This finding provides preliminary linear evidence for subsequent causal path analysis of "course → attitude".

Confirmatory Factor Analysis To examine factorial validity, a CFA was performed on the 14-item Chinese UCLA-GAS. The four-factor solution (social, sympathy, medical, resource) yielded adequate fit indices (Table 10). Factor loadings ranged 0.46–0.79 and were statistically significant ($p < 0.01$), indicating that the theoretical dimensionality held in our medical-management student sample. Composite reliability for each factor exceeded 0.70, and AVE values were above 0.50, demonstrating convergent validity (Table5). CFA Fit Indices and Standardised Factor Loadings for the Chinese UCLA-GAS (n = 205)

Our CFA (Table 5) corroborated the four-factor structure reported by Cheng et al. (2017), but used confirmatory rather than exploratory methods, thereby providing stronger evidence that the Chinese UCLA-GAS retains its theoretical structure when administered to medical-management students.

**Table 5. Elderly Attitude Scores Among Medical Management Students by Category**

| Fit Index / Factor | Value / Range |
|---|---|
| $\chi^2$/df | 1.96 |
| CFI | 0.93 |
| TLI | 0.91 |
| RMSEA (90 % CI) | 0.049 (0.032–0.065) |
| SRMR | 0.042 |
| Standardised loadings | 0.46 – 0.79* |
| Composite reliability | 0.73 – 0.78 |
| Average variance extracted (AVE | 0.51 – 0.55 |

*All factor loadings significant at $p < 0.001$.

### 4.2.4. Career Intentions Among Different Categories of Medical Management Students

Univariate analysis revealed significant differences in career aspirations among medical management students based on whether they had taken geriatric courses, their relationship with older adults, prior experience caring for older adults, participation in geriatric volunteer activities, and engagement with geriatric-related information. Students who had taken geriatric courses, maintained better relationships with older adults, possessed experience caring for older adults, participated in geriatric volunteer activities, and followed geriatric-related information demonstrated greater willingness to pursue careers in geriatric health management post-graduation (Table 6).

**Table 6. Career Intentions Among Medical Management Students by Category**

| Variable | Unwilling | Willing | $\chi^2$ | P-value |
|---|---|---|---|---|
| Gender | | | | |
| Male | 26 | 56 | 0.059 | 0.880 |
| Female | 41 | 82 | | |
| Registered residence | | | | |
| Urban | 23 | 46 | 0.020 | 0.876 |

| | | | | |
|---|---|---|---|---|
| Rural | 44 | 92 | | |
| Only child status | | | | |
| Yes | 32 | 56 | - | - |
| No | 35 | 82 | | |
| Whether studying geriatric courses | | | | |
| Yes | 2 | 25 | 9.029 | 0.002 |
| No | 65 | 113 | | |
| Do you have relevant internship experience in elderly health management? | | | | |
| Yes | 8 | 26 | 1.552 | 0.237 |
| No | 59 | 112 | | |
| Family Attitudes Towards the Elderly | | | | |
| Good | 56 | 128 | 4.126 | 0.051 |
| Average | 11 | 10 | | |
| Poor | - | - | | |
| Have you ever lived with elderly people? | | | | |
| Yes | 55 | 123 | 1.955 | 0.188 |
| No | 12 | 15 | | |
| Relationship with the elderly | | | | |
| Good | 48 | 120 | 7.152 | 0.011 |
| General | 19 | 18 | | |
| Poor | - | - | | |
| Do you have experience caring for the elderly? | | | | |
| Yes | 32 | 90 | 5.704 | 0.023 |
| No | 35 | 48 | | |

| | | | | |
|---|---|---|---|---|
| Have you participated in elderly volunteer activities? | | | | |
| Yes | 29 | 83 | 5.174 | 0.026 |
| No | 38 | 55 | | |
| Do you follow information related to the elderly? | | | | |
| Yes | 34 | 113 | 21.555 | 0.000 |
| No | 33 | 25 | | |

## 5. Multivariate Analysis of Medical Management Students' Attitudes Towards the Elderly and Their Willingness to Work in the Field

### 5.1. Hierarchical Regression Analysis of Medical Management Students' Attitudes Towards the Elderly

With attitudes towards the elderly as the dependent variable, statistically significant variables from the univariate analysis were incorporated into a hierarchical regression model. Assignments are detailed in Table 1 at and Table 2, with results presented in Table 7 at and Table 8 .Model 1 represents the basic model incorporating control variables. Models 2–6 sequentially added participation in elderly-related voluntary activities, attention to elderly-related information, virtual simulation course evaluation, and willingness to pursue geriatric health management careers. Results from Models 1–3 indicate that gender and personal relationship with the elderly significantly influence medical management students' attitudes towards the elderly: female students and those with better personal relationships towards the elderly exhibit more favourable attitudes.Results from Models 4–6 indicate that when willingness to pursue geriatric health management careers is excluded from the model, virtual simulation course evaluations exert no significant influence on attitudes towards the elderly. However, when this willingness is included, virtual simulation course evaluations yield a significant positive impact on attitudes towards the elderly.This may occur because career intention suppresses the influence of virtual simulation course evaluation on attitudes towards the elderly. When career intention is uncontrolled, its negative impact masks the positive effect of course evaluation. Controlling for career intention allows the positive influence of course evaluation to manifest.

To further validate the masking effect of employment intention between virtual simulation course evaluation and elderly attitudes, a mediation analysis was conducted. This analysis controlled for gender and relationship with the elderly as independent variables, with virtual simulation course evaluation as the dependent variable, employment intention as the mediating variable, and elderly attitudes as the outcome variable. Results indicated:

Direct effect: The standardised regression coefficient of virtual simulation course evaluation on elderly attitudes decreased from 0.146 ($P < 0.05$) to 0.108 ($P < 0.05$) after introducing employment intention, remaining significant. This indicates partial masking rather than complete mediation.

Partial Mediation Effect: The path coefficient for employment intention on attitudes towards the elderly was −0.192 ($P < 0.01$), with Bootstrap 95% CI [−0.268, −0.118] excluded zero, confirming a significant negative indirect effect along the pathway "course evaluation→willingness to engage→attitudes towards the elderly". This implies that higher course ratings→increased student willingness to pursue elderly health management→heightened concerns about responsibility and pressure → a slight decrease in emotional ratings towards the elderly.

Effect size: The masking effect accounted for 26.0% of the total effect, indicating that approximately one-quarter of the positive impact of the virtual simulation course on attitudes was offset by the "perception of heightened pressure accompanying high willingness".

Given that univariate analysis revealed only "attention to elderly-related information," "enrolment in geriatric courses," "personal relationships with the elderly," "caregiving experience,"and "volunteering participation" significantly correlated with career intent ($P < 0.05$), while variables such as gender, household registration, and internship experience showed no statistical differences ($P > 0.05$), subsequent models incorporated only these five significant variables as control covariates to purify the masking effect estimation.Bootstrap sampling (n=5000) revealed: - Virtual simulation course evaluation → employment intention pathway: positive ($\beta=0.159$, SE=0.045, $P<0.001$)while the path from employment intention to attitudes towards the elderly was negative ($\beta= -0.192$, SE = 0.062, $P < 0.01$). The 95% CI for the indirect effect [-0.051, -0.012] excluded zero, confirming the existence of a negative masking effect.The direct effect remained significant ($\beta = 0.108$, SE = 0.051, $P < 0.05$), accounting for 73.8% of the total effect. This suggests that the positive influence of the course on attitudes was partially offset by the "high responsibility pressure accompanying high willingness," consistent with the single-factor screening results (Table 7).

The “high-willingness–high-pressure” pattern is consistent with occupational-stress theory: geriatric health management embodies high “decision responsibility” and “task significance,” which are core job demands (Karasek and Robert, 1979). When the course immerses students in high-consequence scenarios (e.g., resource allocation, care planning), their professional identity strengthens, yet they also appraise the heavy responsibility (“I will be accountable”). If coping resources (stress-management skills, supervisory coaching) are insufficient—as is common in undergraduate training—the resulting emotional strain can slightly lower affective ratings toward older adults (Lazarus, 1984). The present 26 % masking effect thus reflects a demand–resource imbalance rather than a genuine attitude reversal. Embedding stress-inoculation and role-modelling components within future simulation modules could buffer this strain and fully unlock the course’s attitudinal benefits.

In summary, career aspirations exert a partially negative masking effect along the 'curriculum→attitude' pathway. Whilst the curriculum enhances students' professional interest, it simultaneously activates perceptions of pressure stemming from the 'significant responsibilities of elderly care', thereby slightly inhibiting further growth in emotional attitudes.Teaching practice must concurrently embed "career support, role modelling, and stress management" content within virtual simulation modules to overcome the psychological bottleneck of "the more willing, the more hesitant," thereby fully unleashing the course's dual impact on technical skills and emotional engagement.

**Table 7. Analysis of Mediation Effect**

| Effect path | Standardized coefficient | SE | 95% CI | Effect size |
|---|---|---|---|---|
| Total effect (Course→Attitude) | 0.146* | 0.059 | [0.029,0.262] | 100% |
| Direct effect | 0.108* | 0.051 | [0.008,0.208] | 73.8% |
| Indirect effect (Curriculum → Willingness → Attitude) | −0.038** | 0.015 | [−0.068,−0.010] | −26.0% |

**Table 8. Analysis Results of Attitude Model Towards Elderly Population Among Medical Management Students**

| | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 |
|---|---|---|---|---|---|---|
| Gender | 0.222** | 0.215** | 0.214** | 0.211** | 0.210** | 0.206** |
| Relationship with the elderly | -0.223** | -0.207** | -0.191** | -0.165* | -0.203** | -0.169* |
| Whether one has participated in volunteer activities related to the elderly | | -0.111 | -0.097 | -0.086 | -0.106 | -0.093 |
| Whether one follows information related to | | | -0.053 | -0.042 | -0.097 | -0.091 |

| | | | | | | |
|---|---|---|---|---|---|---|
| the elderly | | | | | | |
| Virtual simulation course evaluation | | | | 0.101 | | 0.146* |
| Intention to Pursue a Career in Geriatric Health Management | | | | | -0.158* | -0.192** |
| F | 10.479 | 7.956 | 6.077 | 5.289 | 5.973 | 5.742 |

Note: *$p$<0.05, **$p$<0.01, ***$p$<0.001

### 5.2. Multivariate Analysis of Career Intentions Among Medical Management Students

Using medical management students' employment intentions in geriatric health management as the dependent variable, statistically significant variables from univariate analysis were incorporated into a binary logistic regression equation. Assigned values are detailed in Table 8 of . The regression equation yielded P < 0.001, indicating statistical significance of the model; the Hosmer-Lemeshow test P-value was 0.649, demonstrating good model fit.

Results indicate that "whether one follows elderly-related information," "whether one has taken gerontology courses," "virtual simulation course evaluations,"and "attitude towards the elderly" as influencing factors for career intent (P < 0.05). The regression coefficients were 1.437, 2.419, 0.159, and -0.081 respectively, indicating that "attention to elderly-related information," "enrolment in geriatric courses," and "virtual simulation course evaluation" positively influence career intent, while "attitude towards the elderly" negatively impacts it.

The OR value for "whether one follows information related to the elderly" was 4.209, indicating that medical management students who follow such information have 4.209 times the willingness to pursue careers in geriatric health management compared to those who do not. The OR value for "whether one has taken geriatric courses" was 11.235, indicating that students who have taken such courses have 11.235 times the willingness to pursue careers compared to those who have not.The OR value for "virtual simulation course evaluation" was 1.173, indicating that for each unit increase in students' evaluation scores for virtual simulation courses, their willingness to pursue careers in this field increased by 17.3%; The OR value for "attitude towards the elderly" was 0.922, indicating that for each unit increase in students' attitude scores towards the elderly, their willingness to pursue careers in this field was 0.922 times that of the baseline. Results are presented in Table 8.

Table 10 summarizes the multicollinearity diagnostic results for the stratified regression model and logistic regression model. All VIF values are <2.0, significantly lower than the commonly used

thresholds of 5 or 10, with tolerances all> 0.40, indicating no significant multicollinearity among independent variables and reliable regression coefficient estimatesHair et al. (2019).The highest VIF (1.339) was observed for the item “Do you pay attention to information related to the elderly?”, suggesting minimal overlap with other predictive variables. Therefore, the regression coefficients reported in the attitude model (Table 8) and the occupational intention model for elderly health management (Table 9) do not exhibit concerning multicollinearity issues and can be interpreted with confidence.

**Table 9. Analysis of Medical Management Students' Intentions Regarding Employment in Geriatric Health Management**

| Independent Variables | Regression Coefficient | Standard Error | P-value | *Odds* Ratio |
|---|---|---|---|---|
| Relationship with the elderly | 0.440 | 0.474 | 0.353 | 1.552 |
| Experience in caring for the elderly | 0.530 | 0.357 | 0.138 | 1.699 |
| Have you ever participated in volunteer activities related to the elderly? | 0.194 | 0.370 | 0.599 | 1.215 |
| Do you follow information related to the elderly? | 1.437 | 0.407 | 0.000 | 4.209 |
| Whether taking courses on ageing | 2.419 | 0.809 | 0.003 | 11.235 |
| Virtual Simulation Course Evaluation | 0.159 | 0.045 | 0.000 | 1.173 |
| Elderly Attitude | -0.081 | 0.028 | 0.004 | 0.922 |
| Constant | -1.207 | 1.374 | 0.380 | 0.299 |

Note: Cox-Snell $R^2 = 0.251$, Nagelkerke $R^2 = 0.350$, $P = 0.000$

**Table 10. Regression Analysis of Attitude towards the Elderly and Multiple Linear Analysis of the Willingness to Work in Medical Management**

| Project | Nonstandardized Coefficient | | Standardized Regression Coefficient Beta | T-value | P-value | Collinearity Statistics | |
|---|---|---|---|---|---|---|---|
| | regression coefficient | standard error | | | | Tolerance | VIF |
| Constant | 46.021 | 4.623 | | 9.955 | 0.000 | | |
| Gender | 3.196 | 1.022 | 0.206 | 3.128 | 0.002 | 0.992 | 1.008 |
| Relationship with the elderly | -3.331 | 1.433 | -0.169 | -2.325 | 0.021 | 0.818 | 1.222 |
| Have you ever participated in volunteer activities related to the elderly? | -1.416 | 1.066 | -0.093 | -1.329 | 0.185 | 0.883 | 1.132 |
| Do you follow information related to the elderly? | -1.537 | 1.281 | -0.091 | -1.200 | 0.232 | 0.747 | 1.339 |
| Virtual Simulation Course Evaluation | 0.252 | 0.124 | 0.146 | 2.029 | 0.044 | 0.830 | 1.204 |
| Intention to Pursue a Career in Geriatric Health Management | -3.115 | 1.162 | -0.192 | -2.680 | 0.008 | 0.837 | 1.195 |

## 6. Discussion

### 6.1. Attitudes of Medical Management Students Towards the Elderly and Influencing Factors

This study found that medical management students' attitude towards the elderly scored 47.36 ± 7.620. Among them, 145 individuals (70.7%) scored above the median of 42 points, 29 individuals (14.1%) scored exactly 42 points, and 31 individuals (15.2%) scored below 42 points, indicating an overall positive attitude .

Influential factors included gender and personal relationships with older adults. Previous research confirming gender's impact on medical students' attitudes towards older adults was replicated here, with female students exhibiting more positive attitudes than their male counterparts .

Among life experiences, the relationship with older people significantly influenced medical management students' attitudes towards them. Students with better relationships with older people held more positive attitudes. However, factors such as "whether they pay attention to information related to older people" and "whether they have participated in volunteer activities related to older people" did not affect students' attitudes towards older people. Previous research has confirmed that participation in volunteer activities related to older people positively influences medical students' attitudes towards them .However, this conclusion was not confirmed among medical management students, potentially due to the lower quality of their participation in elderly-related volunteering.

Regarding educational background, taking geriatric courses does not influence students' attitudes towards the elderly. Conversely, virtual simulation course evaluation scores do affect these attitudes: higher scores correlate with more favourable attitudes.Extensive domestic research confirms that exposure to geriatric medicine education significantly influences medical students' attitudes towards older adults Ross (2020). However, the impact of differing curricula and content on these attitudes remains to be fully established. In this study, the geriatrics courses undertaken by medical management students were not tailored to their disciplinary characteristics, whereas the virtual simulation course developed specifically for this programme did influence their attitudes towards older adults.

The virtual simulation course influences attitudes towards the elderly through career aspirations, with medical management students' career intentions serving as a predictor of these attitudes.It is generally assumed that students willing to pursue careers in geriatric health management should exhibit more positive attitudes towards the elderly. Specifically, the virtual simulation course produces a significant positive effect on attitudes through a three-stage pathway: "immersive experience – role empathy–professional identification". Students complete tasks such as functional impairment assessments and home visits from a "caregiver's" first-person perspective within VR scenarios, where high interactivity activates emotional resonance.

However, career aspirations exert a partial negative masking effect within the 'course→attitude' pathway. This may stem from the fact that information about older adults and geriatric medicine education received by these medical management students often centres on negative scenarios,

leaving them without systematic, comprehensive geriatric medicine training.The masking effect indicates that approximately 26% of the positive impact of virtual simulation courses on attitudes towards older adults is offset by "willingness to practise": the higher the course evaluation, the greater the students' willingness to engage in geriatric health management. However, this "willingness" simultaneously evokes psychological pressure stemming from a sense of "significant responsibility," leading to a slight decline in emotional scores.This cognitive dynamic may result in medical management students expressing a willingness to work in geriatric health management from a professional perspective, yet maintaining negative attitudes towards older adults.Therefore, while maintaining immersion and motivation, courses should incorporate stress-reduction and support components to mitigate the emotional attrition caused by "high willingness-high pressure," thereby fully unlocking their potential to enhance attitudes towards the elderly.

### 6.2. Career Intentions and Influencing Factors Among Medical Management Students

The majority (138 students, 67.3%) of medical management students expressed willingness to pursue careers in elderly health management post-graduation, indicating relatively positive career aspirations.Among life experiences, only "whether one pays attention to information related to the elderly" can predict career intentions among medical management students. Those who pay attention to such information are 4.209 times more likely to pursue geriatric health management careers than those who do not. This indicates that guiding students to proactively engage with elderly-related information in daily life can enhance their willingness to work in this field.

Regarding educational background, "whether they have taken geriatric courses" predicts students' willingness to pursue careers in geriatric health management. Students who have taken such courses are 11.235 times more likely to express such willingness than those who have not. This demonstrates that taking geriatric courses significantly increases students' desire to work in geriatric health management.

Evaluations of virtual simulation courses influence medical management students' career aspirations. Each unit increase in students' evaluation scores for virtual simulation courses elevates their career aspirations by 17.3%. This demonstrates that virtual simulation courses related to ageing can also significantly enhance students' willingness to pursue careers in geriatric health management. Evidently, diverse forms of medical education courses related to the elderly can collectively enhance professional competence and strengthen medical management students' aspirations for careers in geriatric health management.

Attitudes towards older adults can influence medical management students' willingness to pursue careers in geriatric health management. Existing research largely confirms that positive attitudes towards older adults among clinical medicine and nursing students positively predict their willingness to work in geriatric medicine and nursing (Sivarajan, 2025). Furthermore, studies have demonstrated that positive attitudes towards older adults among students in other medical-related fields, such as nutrition, are significant predictors of their willingness to collaborate with older adults.However, in

this study, each unit increase in medical management students' attitude scores towards older adults reduced their career intention by 0.922 times. This indicates that attitudes towards older adults inhibit career intention among these students, contradicting existing research findings.This may relate to medical management students' perception of responsibility: those with more favourable attitudes towards older adults tend to have better relationships with them. They may recognise that working in elderly health management entails greater responsibility, and this awareness of occupational pressure and duty may deter them from pursuing careers in this field. Guiding medical management students with positive attitudes towards older adults to consider and enter the health management sector, while enhancing their professional understanding and identification with the field, holds significant importance for improving the quality of health management for older adults.

### 6.3 Limitations of the Study The following limitations should be noted when interpreting the results

#### 6.3.1 Insufficient sample representativeness

The data were collected through convenience sampling from third-year students majoring in Public Administration at a single medical university, resulting in a highly concentrated sample in terms of geographic location, institutional type, and academic year. This may introduce selection bias. Consequently, the study's conclusions may not be generalizable to other universities, academic years, or medical management students with different educational systems.

#### 6.3.2 Cross-sectional Design

All variables were measured immediately after the completion of the virtual simulation experiment. Long-term effects could not be inferred, nor could it be determined whether students' attitudes and career intentions changed over time or with subsequent clinical-management internship experiences.

#### 6.3.3 Uncontrolled Potential Factors

Variables potentially influencing attitudes, such as family socioeconomic status, prior virtual simulation experience, and personality traits, were not included in the model. Additionally, environmental factors like teaching styles of instructors and concurrent interventions in other courses were not separated, which may lead to estimation bias.

## 7. Conclusion

As China's population continues to age, single-disease management can no longer meet the health needs of older adults. Healthy ageing and active ageing have become development priorities, with health management gaining increasing prominence (Hao, 2019). Medical management students, as a vital reserve force for geriatric health management services, directly influence the quality and efficiency of healthcare services for older adults through their attitudes and willingness to work in this field.Regarding research status, existing domestic studies predominantly focus on medical students in clinical medicine, nursing, and other specialisations requiring professional medical skills,

concentrating on geriatric medical services and care domains. Research involving medical management students remains scarce. While studies confirm that geriatric medicine education can influence students' attitudes towards the elderly, their implementation methods face temporal and spatial constraints, hindering large-scale replication and promotion. Overseas research primarily targets students in nutrition,pharmacy, and other medical-related disciplines (James, 2024).These studies explored their attitudes towards the elderly and willingness to pursue careers in health management (Vitman-Schorr, 2025).

Consequently, this study engaged 205 third-year students from a public health management programme at a medical university in April 2024, all voluntarily participating in an anonymous survey (having completed a virtual simulation course on optimising community hospital services in an ageing society context). Utilising a self-designed questionnaire (covering general background information and career aspirations) alongside the UCLA Attitudes Towards the Elderly Scale,Employing a five-point Likert scale, the study evaluated the virtual simulation course's effectiveness and students' attitudes towards older adults. SPSS 26.3 was used to conduct univariate analysis, hierarchical regression analysis, and binary logistic regression analysis to investigate students' attitudes towards older adults, their willingness to pursue careers in elderly health management, and the influencing factors. Results indicate that gender and relationships with older adults influence students' attitudes towards older adults, while taking geriatric courses and following information related to older adults influence career willingness.

Concurrently, this study explored the role of the virtual simulation practice course in shaping students' relevant attitudes and career aspirations (Beverly, 2025).Findings indicate that students' attitudes towards the elderly and their willingness to pursue careers in this field generally exhibit a positive trend. It was confirmed that a medical management virtual simulation course set against the backdrop of an ageing society can simultaneously enhance medical management students' attitudes towards the elderly and their willingness to work in this field. However, this "dual enhancement" effect is not linear but follows a psychological pattern characterised by a "high willingness-high stress" dynamic:When students developed strong professional interest through the course, their emotional ratings towards the elderly slightly declined due to concerns about caregiving responsibilities and occupational burdens (masking effect accounted for 26%).

Based on these findings, course design must extend beyond technical and emotional experiences to concurrently integrate modules on "career support, role modelling, and stress management." This helps highly empathetic students translate positive attitudes into tangible career commitment. For future implementation, it is recommended to bundle virtual simulation experiments with compulsory geriatrics courses and high-quality volunteer programmes into a "trinity" teaching package. Concurrently, establish joint university-industry-government internship bases.to continuously monitor students' long-term career choices, thereby validating the intervention's sustainability and transferability (Rashidi, 2022). This will provide empirical evidence and replicable, scalable models for medical schools to adjust teaching strategies, cultivate healthcare management personnel with

geriatric care competencies, and optimise management talent development pathways in an ageing society.

**Author Contributions:**

Luyao Pan contributed to the conceptualization, methodology, and data analysis of the study. Wanting Lin provided guidance on theoretical framing and critical revisions of the manuscript. Xiangyu Chen supervised the overall project and coordinated the research process. All authors have read and agreed to the published version of the manuscript.

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The authors declare no conflict of interest.

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