Original Article

An aging simulation game's impact on the attitudes of nursing students

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ABSTRACT

Background & Aim: The aging of the population poses new challenges, among others, a greater concern with the teaching of geriatrics and gerontology, especially to future health professionals. The simulation game "Aging Nursing Game" ® was used with the objective of evaluating the impact of an aging simulation game on nursing students' attitudes towards the elderly.

Methods & Materials: A pre-test and post-test type quasi-experimental study was performed, without control group. The research was developed between February and July 2018. The subjects of this study were second-year undergraduate nursing students. A game was used as an intervention. To measure the effectiveness of the game, a questionnaire was applied before and after the intervention. The data collection instrument consisted of a questionnaire composed of two parts, the first part for sociodemographic characterization, and another consisting of the Portuguese version of the Kogan Scale (KAOP).

Results: The sample consisted of 45 undergraduate nursing students from the 2nd year corresponding to 75% of the population. The attitude towards the elderly person improved significantly before and after the intervention. Of the 34 items on the Kogan Scale (KAOP), 21 improved significantly.

Conclusion: The simulation game has proven to be effective in teaching students changing attitudes towards the elderly (p <0.05).

Introduction

The current scenario of global aging determines a greater concern with the teaching of geriatrics and gerontology among health professionals (1), in order to allow the acquisition of specific skills to meet elderly population health needs (2, 3). In the specific case of nurses, specialized training in geriatrics and gerontology is essential for future professionals to provide quality of care (4), making it vital for nurses to be educated to attend the complex needs of this population group (5).

A number of studies have been suggesting beneficial effects of using educational games in learning, like simulation (1).

The integration of items that reduce age-related stereotypes and myths can help improve empathy and attitudes in nursing students (6-8). However, nursing students may find it difficult to meet the elderly person's health care needs as they have not experienced the challenges related to aging (4). Understanding the other's perspective can be complex, especially for someone who has never experienced on first-hand aging, or even illness-related disabilities, which may lead to less empathy and understanding of the elderly person.

The attitude of empathy on students of the health sciences must be taught, acquired and cultivated so that care is not reduced to the execution of technical actions and interventions (9-12).

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However, empathy is a difficult aspect to teach students, although it is one of the most important aspects of nursing care (5, 13). If the teacher could change students' views at the beginning of the course, it may be possible to reverse the ageism and waken their interest to follow a career in geriatrics (1). This issue highlights the pertinence of this path that rose one question: Does a game about aging simulation in nursing students promote a positive attitude toward the elderly?

Several strategies have been implemented to prepare and encourage students towards elderly population increasing needs, with great emphasis in the last decades in the use of simulation (11). Simulation games can be used to help students understand each other's experiences (4).

In the universe of problem-based teaching and simulation, several resources can be used, namely: low-tech simulators, computer-based virtual simulators, complex task simulators, and high-fidelity simulators. The choice of some of these resources is based on the scenario objectives and available resources (14).

Specifically, with the elderly, the use of a low fidelity aging simulator allows students to experience functional changes often associated with aging, such as hearing loss, vision, and mobility (4, 13). In taking on the role of the elderly, participants are asked to navigate in various simulations, where they are faced with a number of common obstacles for the elderly in the real world, but generally unknown to those who are young and healthy (4). As pointed out by Coelho et al. (2017), in a systematic review, the aging simulator can contribute, in addition, to promote elderly's health knowledge, allows the understanding of their difficulties and, consequently, care

provided (11). Students may not be aware of the feelings and experiences of older people before experiencing aging-related changes, and simulation activities can be a useful mechanism to enable students to experience them in first hand (4).

We carried out this path, sure of the need for intervention at this level, with the objective of evaluating the impact of an aging simulation game on nursing students' attitudes towards the elderly.

Methods

Taking into account the purpose of this investigation, which was to evaluate the impact of the intervention, we designed a pre-test and post-test type quasi-experimental study, without a control group. The research was carried out between February and July 2018. The subjects of this study were undergraduate nursing students from the second year of a School of Health of Northern Portugal (N=60). There were students who didn´t participate in the 3 steps of the study (Pre-test questionnaire, intervention, and post-test), so the data were excluded. The only inclusion criterion applied was to be enrolled in the 2nd year of the nursing degree and accepted to participate in the study. As exclusion criterion, we considered the students who refused to participate in the study. Participants only had contact with the target population in the clinical teaching of geriatrics that is carried out in the 3rd year.

All students who participated in the intervention were invited to complete the research tools at the beginning of the activity and immediately after the activity was completed. The questionnaires were coded to link pre-tests to post-tests. Students were informed that all responses would be confidential and their answers would remain anonymous. Innovation is crucial to the

success of any intervention, and innovative methods meet the needs of nursing students (14). In the first stage, a questionnaire was used to diagnose nursing students' attitudes towards aging. Afterward the aging simulators were applied in the classroom through the game "Aging Nursing Game" in "Role Play" format, and in the end, the same instruments were applied again. The project obtained institutional authorization and favorable opinion from the ethics committee (73/2018).

The data collection instrument consisted of a questionnaire composed of two parts, the first part with sociodemographic characterization, and another consisting of the Portuguese version of the Kogan Scale (KAOP) (15). The scale consists of 17 pairs of logical opposites (one of negative content, N, and one of positive content, P), making up 34 items in total, and is organized by a Likert scale, with six terms (15). In order to facilitate the obtained results, a statistical inversion of the negative items of the scale was performed, so that the greater the overall value, the more positive is the attitude towards the elderly person. The scale has a range between 34 and 204 points, presenting its midpoint at 119. The scale has seven dimensions: residential aspects; feelings caused by living with elderly people; the individuality of the elderly; interpersonal relationships between generations; dependency; abilities and cognitive style, personality and personal appearance, and economic and political power (15).

Statistical Package for the Social Sciences (SPSS), version 24 was used to treat the data. Descriptive statistics were used to explore the characteristics of the sample. Concerning the degree of agreement comparison of the students before and after the training, the Wilcoxon test was used,

since there are paired samples, the same students (before and after the training) responded to the survey. The level of significance considered appropriate for this study was a P value of 0.05.

The Game: "Aging Nursing Game" ®

By incorporating simulated experiences with games, students can gain perspective and understanding of one another's experience before entering into clinical experiences, creating their own perceptions, and developing a greater empathy toward the elderly person (4). The integration of Aging Nursing Game aims to promote greater understanding and awareness of aging, enhancing students' feelings and positive attitudes towards aging (16).

The application of the game was implemented in sessions with prior preparation of scenarios such as residence, visit the pharmacy and nursing appointments. The game includes a board, "Pharmacy" business cards, "Self-care" cards, "Nursing" appointment cards, a game dice, markers to move on the board, boxes of "medication simulators", physical builders, auditory constructs and spectacles for visual restraint. The game was applied over three 4-hour sessions.

Figure 1. Aging Nursing Game®

The objective of the game is to move from the starting point to the end, passing

through the different spaces. Each team has a marker and will follow the orientation that is indicated in the space in which they stop with the marker after the dice roll. According to the space color, players must collect a card of the respective color with specific activities that they must perform. After the respective activity has taken place the card is placed aside and the next team plays, and so on until the end of the game. Each motor and/or sensory constrictor (goggles, gloves, earplugs, upper and lower limbs) is randomly assigned to one student from each team and according to the indications of each card.

Figure 2. Simulator with the constrictors

Throughout the game, daily living activities are carried out, such as medication preparation, self-care, and payments for health services.

The game was created to be used for the teaching of geriatrics and gerontology. Several players can be integrated. It is a board game that incorporates, through a ludic strategy, challenges inherent to aging, experiencing "areas of motor and/or sensory impairment that occur in the aging process, as well as main difficulties in performing daily activities. In this game, by taking on the role of the senior, participants are asked to navigate in various simulations, where they are faced with a number of obstacles. The board game consists of a Board, 15

Cards "Pharmacy", 15 Cards "Self-care", 15 Cards "Nursing", 1 Dice, 6 Markers to move on the board, 1 Hourglass to time the money, fictitious money to perform the transactions, boxes of "medication simulators" and constrictors. In the framework of the constrictors is composed of physical constrictors, to reduce the range of movements, eye constriction glasses, auditory constrictors and gloves to decrease the sensitivity in the accomplishment of the activities. The group is divided into 6 teams that throw the dice and according to the color of the respective house where they were placed they develop the activity described in the card. The houses can be of three distinct colors referring to the activities "Pharmacy", "Self-Care" and "Nursing.

The following is an example of one type of activity for each group of cards:

Pharmacy: "Mr. Antonio goes to the pharmacy with the sensitive shopkeepers to acquire the following drugs (30s):" Alapraging 0.5mg "," Replacement 60mg ". Make the payment. You must choose an opposing team to function as a service pharmacy (2 min challenge time).

Self-care: "Mr. John will read the newspaper for coffee with sensory and visual restrictors. You should read at least one piece of news (2 min challenge time). "

Nursing: Mr. Miguel fell yesterday at home without apparent consequences, comes to the nursing consultation that carries out the teaching. You should choose as a user someone from an opposing team (10 min challenge time).

The game is over when one of the teams manages to reach the end of the board and the winning team.

Results

The sample consisted of 45 2nd year undergraduate nursing students

corresponding to 75% of the population. Regarding the pre-test stage, a low percentage of students (6.7%) reported that they preferred to work with the elderly.

Table 1. Participants' characterization

Variables	N	%	Mean	SD
Gender (N=45)				
Male	10	22.2		
Female	35	77.8		
Age-years (N=45)			23.2	4.8
Marital status (N=45)				
Single	44	97.8		
Married	1	2.2		
Preference to work (N=45)				
Children	11	24.4		
Adults	10	22.2		
Elderly	3	6.7		
Indifferent	13	28.9		
Do not know	8	17.8		

Table 2 shows the descriptive values for each item, before and after the intervention, as well as the correlation between each of the items. A significant increase was observed in 21 of the 34 items from the pre-intervention to post intervention scale (p<0.05, table 2). The items: it would probably be best if the majority of the elderly lived in residential units with people of the same age; the elderly fixate on their habits and are unable to change; the majority of the elderly tend to let their homes become degraded and unpleasant; the elderly have insufficient power in business and politics; the elderly are a very relaxing company; we can count on a pleasant residential area, when a considerable number of elderly people live in it; there are some exceptions, but in general the elderly are very similar to each other; it is evident that most of the elderly are very different from each other; for the most part, the elderly should be more concerned with their personal appearance; they are too sloppy; most elderly people are constantly complaining about young people's behaviour; it is rare to hear the

elderly complain about the behaviour of the young and the majority of the elderly make excessive demands of love and encouragement, were items that although the averages increased after the intervention, they did not obtain alterations of agreement explained from the statistical point of view before and after the intervention.

Table 3 shows the mean values for the scale as a whole and for each scale dimension. It is observed that the scores of the students changed after the experience of the aging game, both within the global scale and in its different dimensions.

Regarding housing segregation, the previous value was also higher than the average value of the subscale, with a mean of 23.7 (Average value 21), as in almost all other dimensions, where the values are slightly higher than the average value of the subscales. The only dimension in which this is not the case is interpersonal relations between generations (dimension 4), where students show a slightly lower attitude (20.0) than the average value (21).

On the other hand, when asked in the post-test phase with which population group would they like to work in the future, it was observed that the elderly passed the preference of 33.3% of the participants as opposed to the initial 6.7 %.

Discussion

These results indicate a change of the attitude's after participation in the "Aging Nursing Game" (P=0,000), measured by the Kaop Scale (15). It is important to note that the majority of students started with scores above the mean value of the scale (mean 119) which indicates previous positive attitudes towards the elderly. These results were slightly different in a study carried out in a population of Portuguese nurses (n=1068), where they identified negative attitudes in relation to the elderly (17).

Table 2: Pre and post-test statistics for each scale item

	Item	Pre-test			Post-test			P value
		25th Quartil	Median	75th Quartil	25th Quartil	Median	75th Quartil	
1 N	It would probably be best if most of the elderly lived in residential units with people of the same age.	3	4.0	5	3	5.0	6.0	0.085
2 P	It would probably be best if most of the elderly lived in residential units also inhabited by younger people.	4	4.0	5	4	4.0	5.0	0.026
3 N	There is something different about most seniors; it is difficult to find out what	2	3.0	4	2	4.0	5.0	0.003
4 P	In fact, most seniors are no different from other people; are as easy to understand as	3	3.0	4	4	5.0	5.0	0.001
5 N	In general, the elderly fixate on their habits and are unable to change.	2	3.0	4	2	3.0	5.0	0.079
6 P	In general, the elderly are able to adapt to new situations when necessary.	2	3.0	4	3	4.0	5.0	0.002
7 N	For the most part, the elderly prefer to leave work as soon as their pensions or their children can support them.	3	5.0	6	5	6.0	6.0	0.001
8 P	For the most part, the elderly would prefer to continue to work for as long as possible, to be dependent on others.	4	5.0	6	4	6.0	6.0	0.025
9 N	Most seniors tend to let their homes become degraded and unpleasant.	3	4.0	5	3	5.0	6.0	0.258
10 P	In general, the elderly keep their homes clean and enjoyable.	3	4.0	5	3	4.0	5.0	0.017
11 N	It is foolish to say that wisdom comes with old age.	3	4.0	6	3	5.0	6.0	0.038
12 P	People become wiser as they grow older.	4	4.0	5	4	5.0	6.0	0.012
13 N	The elderly have excessive power in business and politics.	3	4.0	6	2	3.0	4.5	0.001
14 P	The elderly have insufficient power in business and politics.	2	3.0	4	2	3.0	4.0	0.820
15 N	Most of the elderly make us feel uncomfortable.	3	4.0	5	4	5.0	6.0	0.001
16 P	In general, the elderly are a very relaxing company.	4	5.0	5	4	5.0	5.0	0.194
17 N	In general, the elderly crowd out others with their insistence on talking about the "good	3	4.0	5	4	4.0	5.5	0.028
18 P	One of the most interesting and captivating qualities of most seniors is in their evocations of past experiences.	4	4.0	6	5	6.0	6.0	0.001
19 N	In general, the elderly spend too much time putting their noses in someone else's life and giving advice that nobody has asked for.	3	4.0	5	4	4.0	5.0	0.003
20 P	In general, the elderly tend to respect others' privacy and only give advice when they ask for it.	2	3.0	4	3	4.0	5.0	0.005
21 N	If the elderly expect them to like them, they should first try to get rid of their irritating defects.	4	5.0	6	5	6.0	6.0	0.001
22 P	Come to think of it, the elderly have the same flaws as everyone else.	4	4.0	6	5	6.0	6.0	0.000
23 N	In order to maintain a pleasant residential area, it would be better not to have too many elderly people living there.	4	4.0	5	4	6.0	6.0	0.003
24 P	We can count on a pleasant residential area when there is a considerable number of elderly people living in it.	3	4.0	5	4	4.0	5.0	0.170
25 N	There are some exceptions, but in general the elderly are very similar to each other.	4	5.0	6	3	4.0	6.0	0.124

26 P	It is evident that most of the elderly are very different from each other.	4	5.0	5	4	4.0	6.0	0.707
27 N	For the most part, the elderly should be more concerned with their personal appearance; are too sloppy.	3	4.0	5	3	5.0	5.0	0.085
28 P	In general, the elderly have a clean and neat appearance.	3	4.0	5	3	4.0	5.0	0.001
29 N	For the most part, the elderly are irritable, crabby and unpleasant.	4	4.0	5	4	5.0	6.0	0.001
30 P	In general, the elderly are cheerful, pleasant and humorous.	4	4.0	5	4	5.0	5.0	0.003
31 N	For the most part, the elderly are constantly complaining about young people's behavior.	2	3.0	4	2	3.0	3.5	0.191
32 P	Old people are rarely heard to complain about young people's behavior.	1	2.0	3	2	3.0	3.0	0.160
33 N	For the most part, the elderly make excessive demands of love and encouragement.	4	4.0	5	3	4.0	5.0	0.220
34 P	In general, the elderly do not need more love and encouragement than anyone else.	1	2.0	3	2	3.0	3.5	0.001

Table 3. Attitudes towards the elderly population, total scale analysis and subscales

Parameters	Pre-test			Post-test			P value
	25th Quartil	Median	75th Quartil	25th Quartil	Median	75th Quartil	
Total KAOP Scale (34 items. Amplitude 34-204)	116	126	136	131	145	160	0.001
Residential Aspects (Subscale 6 items. Amplitude 6-36)	21	23	26	23	28	30	0.001
Feelings of living with the elderly (Subscale 4 items. Amplitude 4-24)	13	15	16	14	17	20	0.001
Individuality of the Elderly (Subscale 4 items. Amplitude 4-24)	15	17	19	16	19	22	0.001
Interpersonal relations between generations (Subscale 6 items. Amplitude 6-36)	18	20	23	20	23	27	0.001
Dependency (Subscale 4 items. Amplitude 4-24)	13	15	17	16	18	20	0.001
Capabilities and cognitive style (Subscale 4 items. Amplitude 4-24)	11	14	17	14	16	20	0.001
Personality and personal appearance (Subscale 4 items. Amplitude 4-24)	14	15	18	16	18	21	0.001
Economic and political power (Subscale 2 items. Amplitude 2-12)	6	7	8	4	7	8	0.029

According to a review study integrating 25 articles, carried out with nurses and nursing students, it is reported that the attitudes in relation to the elderly are inconsistent, with positive, negative and neutral attitudes observed among nurses and students and appearing to be progressively less positive since 2000 (19).

On the other hand, in a study conducted with nurses (n=2585) and nursing students (N=1064) in six countries, although they found differences between countries, the authors reported that both students and nurses obtained positive attitudes regarding the elderly and in relation to work in this field (19). Limited evidence indicates that attitudes toward older people are complex

and contradictory and that influences on nurses' attitudes need further study, both individually and collectively, to build a strong evidence base (6).

A number of variables are described as potential predictors of nurses' attitudes toward the elderly. The variables age, gender, and level of education have been investigated more frequently, but none of them with consistent values (6, 17-19). The exception is the preference for working with older people and the knowledge of aging, which is associated with positive attitudes towards older people (8), which justifies the importance of this path.

The use of a simulation game revealed to be effective among nursing students. Few studies are still reported at this level (1, 4, 8, 12, 16), more so in nursing (13, 20). As Coelho et al (11) point out, given the widely described importance of simulation benefits, more studies using the old-age simulator as a teaching/learning strategy should be carried out.

The contents integrated into the game allow to contribute to a better knowledge regarding the geriatric syndromes, highlighted as manifestly insufficient in the study carried out by Almeida et al. (2015) (17). On the other hand, through the simulation, students experience old-age feelings and difficulties related to aging, which is a useful mechanism for modifying empathy and attitude in care (20).

This study presents a limitation the low representatively of the sample. Some difficulties were evidenced by the comparison with the few studies carried out in this area, using different measuring instruments. In the study conducted by Chen et al., (2015), the effect of the use of the old-age simulator was evaluated using 58 Kiersma-Chen Empathy Scale (KCES) (20).

On the other hand, in the study by Tremayne et al. (2011), in 90 2nd year undergraduate nursing students, the impact of the use of an old-age simulator was evaluated through an instrument developed by the authors on learning efficacy (13). Future studies should clearly identify the methodology of the study, using previously validated instruments, allowing evaluation and comparison of the impact of these strategies (11).

The results emphasize the importance of studies with valid interventions to modify the attitudes toward the elderly, which include simulation games. Incorporating this type of age-related intervention helps to improve empathy and attitudes toward older people. The simulation game proved to be effective in teaching students to understand the perspective of who they care for, particularly those who have not experienced aging or disability related to the disease.

It is intended to replicate the intervention in other groups, namely nurses and other health professionals. To facilitate measurement, it is necessary to apply uniform, valid instruments to measure and compare attitudes towards aging. It would be important to develop additional research to assess the future impact on care.

Finally, it is suggested the development of longitudinal studies, that allow measuring the attitudes of nursing students from the beginning until the end of their training, as well as throughout the years of their professional activity and according to the different contexts.

Conflict of interest

Authors have declared that no competing interests exist.

Acknowledgments

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