Types of Social Engagement Among Older Cancer Survivors and the Effect on Depressive Symptoms and Life Satisfaction: A Latent Class Analysis

Kisook Kim, RN, PhD, and Hyohyeon Yoon, RN

OBJECTIVES: To identify an empirical typology of social engagement and its association with depressive symptoms and life satisfaction among older cancer survivors.

SAMPLE & SETTING: This was a cross-sectional study using data from the Korean Longitudinal Study of Aging.

METHODS & VARIABLES: Latent class analysis was used to categorize social engagement types. Hierarchical regression analysis then investigated the impact of older cancer survivors' social engagement on depressive symptoms and life satisfaction.

RESULTS: Three classes were identified as follows: a religiously centered group, a diverse social participation group, and a passive participation group. Hierarchical regression indicated that the depressive symptoms of the diverse social participation group were significantly lower than those of the passive participation group (β = –0.157, p = 0.002). There was no significant effect on life satisfaction.

IMPLICATIONS FOR NURSING: This study enhances the understanding of engagement patterns and serves as a reference for older cancer survivors who need support.

By 2022, there were more than 18 million cancer survivors in the United States, with 67% of them being aged 65 years or older (Miller et al., 2022). Owing to advancements in early detection, treatment, and prognosis for many cancer entities, the number of cancer survivors worldwide is increasing steadily. Korea is one of the fastest-aging countries in the world, and the proportion of people aged 65 years or older has increased from 5.1% in 1990 to 15.7% in 2020 (Statistics Korea, 2020). Among Korean cancer survivors, 996,051 (46.4% of all prevalent cases) were aged 65 years or older, indicating that one in eight people in that age group had experienced cancer (Kang et al., 2022). Therefore, research on the extended life of older cancer survivors (OCSs) is necessary in terms of physical health and socioeconomic aspects.

Many OCSs experience persistent negative moods caused by cancer-related fear, post-traumatic stress, and financial stress (Barnes et al., 2018). Social engagement has been shown to have a significant impact on reducing depressive symptoms because it increases the life satisfaction of older people in the community and has a positive effect on self-fulfillment (Kim, 2018; Suh & Lee, 2012). Social engagement is defined as "a person's involvement in activities that provide interaction with others in society or the community in order to enhance the quality of life as people age" (Wang et al., 2021, p. 2). Older people's participation in social engagement provides a sense of belonging and effectively reduces depressive symptoms (Amagasa et al., 2017). Participating in social interactions and nurturing robust interpersonal relationships significantly contributes to overall life satisfaction (Kim, 2018). Accordingly, various

studies have been conducted in the United States on the effect of participation in social engagement on OCSs using volunteer and leisure activities and social media platforms (Chun et al., 2022; Heo et al., 2016; Kadambi et al., 2020). However, research on social engagement among OCSs in Korea, an Asian country with a different cultural background, is lacking. Developments in the traditional Confucian and collectivistic Korean society, which emphasizes family ties, rapid industrialization, and modernization, have led to shifts toward individualism, causing changes in family values (Park et al., 2017).

The association between social engagement and mental health also varies based on the types of social engagement, and it is challenging to determine the effectiveness of different types of social engagement (Chao, 2016; Croezen et al., 2015). Participating in religious activities may protect against depression in older adults (Hamilton et al., 2013), but involvement in community organizations can increase depressive symptoms (Croezen et al., 2015). Regarding older adults' life satisfaction, although studies have reported that social engagement can contribute to life satisfaction (Sung & Cho, 2006), some studies have reported no significant association with life satisfaction, subjective health status, or problem alleviation in older adults (Lee & Ko, 2015; Min, 2013). These inconsistent results could stem from individual differences in study participants and because each study had different methods of measuring social engagement and only measured frequency rather than classifying by social engagement types (Lee et al., 2018; Sapp et al., 2003). Given the continuous increase in OCSs and the impact of social engagement on depressive symptoms and life satisfaction, more research is needed to clarify the effects of social engagement among OCSs (Kadambi et al., 2020).

Because the concept and definition of social engagement are wide-ranging and comprehensive, efforts have been made to categorize the various types of social engagement exhibited by OCSs based solely on their participation frequency in social activities. The latent class analysis (LCA) method, which has gained popularity in multiple fields, is well suited for understanding the multidimensional nature of human behavior owing to its person-centered approach (Lanza & Rhoades, 2013). Contrary to traditional variable-centered approaches, LCA is a data-driven and person-oriented technique that classifies individuals into more homogeneous groups (called classes) based on characteristics patterns by estimating the probability of endorsement.

Considering LCA characteristics, to better understand the social engagement types of OCSs, it is important to categorize them based on a human-centered approach and determine which types of engagement are associated with depressive symptoms and life satisfaction. This approach can also facilitate more effective interventions by grouping research participants into clusters with similar characteristics, rather than treating them as isolated individuals.

In the past, working after retirement was not encouraged; however, employment is now considered positively to enjoy an independent and competent old age (Kim & Oh, 2022). The economic activities of older adults have a positive effect on life satisfaction (Kim, 2022), and working older adults are less likely to feel unhealthy and have depression compared to those who are not working (Nakajima et al., 2022). In addition, returning to work after surviving cancer is considered to help restore normalcy and self-esteem (Torp et al., 2019). Therefore, this study derives a typology of social engagement types, including social activities, employment status, and frequency of contact with a close social network. The effects of social engagement type on depressive symptoms and life satisfaction were also examined. The authors hypothesized that (a) OCSs' social engagement types would be identified and (b) the social engagement type would be significantly associated with depressive symptoms and life satisfaction. These results are expected to help establish a basic strategy for social engagement to effectively support the management of depressive symptoms and life satisfaction among OCSs.

Methods

Participants and Procedures

This study uses secondary data analysis and was designed to classify social engagement among OCSs using LCA and to identify the influence of each class on depressive symptoms and life satisfaction. In this study, survey data from 2020 were used, which consisted of eighth-wave data from the Korean Longitudinal Study of Aging (KLoSA) (Korea Employment Information Service, 2020). The KLoSA is a longitudinal panel survey of nationally representative community-dwelling adults aged 45 years or older at the time of data collection. In the baseline interview in 2006, the KLoSA surveyed 10,254 participants identified by a multistage stratified area probability sample of households representing the entire population of Korea, except Jeju Island.

TABLE 1. Sample Characteristics (N = 376)

Characteristic	$\overline{X}$	SD	Range
Age (years)	75.89	6.75	65–97
Annual household income ($)[a]	16,954.22	13,915.54	–
ADLs	0.22	–	0–7
IADLs	0.9	–	0–10
Depressive symptoms	7.05	6	0–28
Life satisfaction	58.22	60	0–90

Characteristic	n	%
Gender		
Female	200	53
Male	176	47
Age (years)		
65–74	166	44
75 or older	210	56
Educational attainment status		
Elementary school or less	185	49
Middle school	54	14
High school	103	28
University or more	34	9
Marital status		
Married	263	70
Single[b]	113	30
Comorbidity[c]		
Yes	298	79
No	78	21
Employment status		
Not employed	318	85
Employed	58	15
Participating in religious gatherings		
No	328	87
Yes	48	13
Participating in social clubs at a senior center		
No	207	55
Yes	169	45
Participating in leisure, culture, or sports clubs		
Yes	352	94
No	24	6

Continued in the next column

TABLE 1. Sample Characteristics (N = 376) *(Continued)*

Characteristic	n	%
Participating in alumni associations, hometown alliances, or clan gatherings		
No	340	90
Yes	36	10
Participating in volunteer activities		
No	375	99
Yes	1	1
Participating in political parties or civic organizations		
No	375	99
Yes	1	1
Participating in others		
No	373	99
Yes	3	1
Frequency of contact with familiar people who live close to them		
Less than 3 times a week	182	48
3 or more times a week	194	52

[a] Reflected the converted value from Korean currency to U.S. dollars (1 U.S. dollar was about 1,300 Korean won)
[b] Including separated, divorced, or widowed
[c] Excluding cancer
ADLs—activities of daily living; IADLs—instrumental ADLs
Note. The ADL scores ranged from 0 to 7, and the IADL scores ranged from 0 to 10. A higher score indicates a greater need for assistance in performing basic activities. Depressive symptoms were measured using the 10-item Center for Epidemiologic Studies Depression Scale. Each of the 10 items was graded using a four-point Likert-type scale ranging from 0 (rarely or none of the time) to 3 (most or almost all the time). The scores range from 0 to 30, with higher scores indicating higher levels of depressive symptoms. Life satisfaction was measured with a single question using an 11-point scale ranging from 0 (not at all) to 10 (very much), with total scores ranging from 0 to 100 points. The higher the score, the higher the subjective life satisfaction.

Initiated in 2006, the baseline survey was conducted every two years, and eight waves were completed by 2020. Untracked participants were excluded from this study. The participants in this study had to meet the following two criteria: (a) They had to be diagnosed with cancer and (b) they had to be aged 65 years or older. Of the original 6,488 participants, 476 were diagnosed with cancer, and the data from a final 376 participants were used for analysis after excluding

100 participants who were aged younger than 65 years. Approval was granted by the ethics committee of Chung-Ang University (Data 22.09.29/No.1041078 -202209-HR-220). Informed consent was waived for the analysis conducted in the current study.

Measures

Demographics

The demographics of interest included socio-demographic, health-related, and psychosocial characteristics. Sociodemographic characteristics included gender, age, educational attainment status, marital status, and annual household income (Kim, 2020; Park, 2017). Marital status was classified as married or single, which included separated, divorced, and widowed (Ju et al., 2016). As the currency in the current data is the Korean won, the authors converted the Korean won to U.S. dollars (1 U.S. dollar was about 1,300 Korean won).

Health-related characteristics included activities of daily living (ADLs), instrumental ADLs (IADLs), and comorbidity (1 = diagnosis of at least one of the following: hypertension, diabetes, cardiovascular disease, and/or cerebrovascular disease; 0 = none) (Hyun et al., 2021; Lee, 2016). In addition, ADLs and IADLs are routine activities that people perform daily, without assistance. If help was needed to perform daily life activities for each question, one point was given. No points (0) were given if the task required no help, and the total score was calculated. The ADL scores ranged from 0 to 7, and the IADL scores ranged from 0 to 10. A higher score indicates a greater need for assistance in performing basic activities. Psychosocial characteristics included depressive symptoms and life satisfaction. Depressive symptoms were measured using the 10-item Center for Epidemiologic Studies Depression Scale. Each of the 10 items was graded using a four-point Likert-type scale ranging from 0 (rarely or none of the time) to 3 (most or almost all the time). The scores range from 0 to 30, with higher scores indicating higher levels of depressive symptoms. The standard cutoff value for depressive symptoms on the Center for Epidemiologic Studies Depression Scale is 10 points (Andresen et al., 1994). Using the current data, Cronbach's alpha was 0.87. Overall life satisfaction was measured with a single question using an 11-point scale ranging from 0 (not at all) to 10 (very much), with total scores ranging from 0 to 100 points. The higher the score, the higher the subjective life satisfaction.

Social Engagement Variable

Social engagement was measured with the following three indicators: social activities, employment status, and frequency of contact with a close social network (Kim, 2020; Lee, 2016; Park, 2017). Social activities were assessed by asking whether the respondents participated in the following seven activities: religious gatherings; social clubs at a senior center; leisure, culture, or sports clubs; alumni associations,

TABLE 2. Model Fit Indices of LC Analysis (N = 376)							
Number of LCs	AIC	BIC	saBIC	Entropy	BLRT p	n	%
2	2,113.102	2,187.764	2,127.481	1	< 0.001	–	–
Model 1	–	–	–	–	–	194	53
Model 2	–	–	–	–	–	182	47
3	2,100.988	2,214.946	2,122.936	0.832	< 0.001	–	–
Model 1	–	–	–	–	–	35	9
Model 2	–	–	–	–	–	42	11
Model 3	–	–	–	–	–	299	80
4	2,105.062	2,258.316	2,134.579	0.798	< 0.235	–	–
Model 1	–	–	–	–	–	28	7
Model 2	–	–	–	–	–	100	27
Model 3	–	–	–	–	–	136	36
Model 4	–	–	–	–	–	112	30

AIC—Akaike information criterion; BIC—Bayesian information criterion; BLRT—bootstrap likelihood ratio test; LC—latent class; saBIC—sample size–adjusted BIC

hometown alliances, or clan gatherings; volunteer activities; political parties or civic organizations; and others. Participation was coded as 1 and nonparticipation as 0. The employment status was coded as 1 for employed and 0 for unemployed. Frequency of contact with a close social network was measured using a single two-part question as follows: "Do you have any friends, relatives, or neighbors who live close to you? If they do, how often do you meet them?" According to the categorical response of the questionnaire, it was divided into three or more times a week (coded as 1) and less than three times a week (coded as 0).

Statistical Methods

Mplus, version 8.6, and IBM SPSS Statistics, version 26.0, were used for data analysis in the study. First, descriptive statistics with frequencies and proportions for the categorical variables and means, SDs, and ranges for the continuous variables were reported. Second, the LCA was performed to classify the types of social engagement. The LCA was used to estimate the probability of being included in a specific class and the item response probabilities (Collins & Lanza, 2010). The best model in LCA was evaluated by increasing the number of identified groups individually. To compare the models for determining the most suitable latent class, the Akaike information criterion (AIC), Bayesian information criterion (BIC), sample size–adjusted BIC (saBIC), entropy value, and bootstrap likelihood ratio test were considered. The lowest AIC, BIC, and saBIC values indicate good model fitness. Entropy values provide information for determining the quality of latent classes, with entropy values higher than 0.8 considered excellent. Bootstrap likelihood ratio test is significant at 0.05, and the model can be used to determine the optimal number of groups (Muthén, 2004).

Third, univariate analysis was conducted to compare the characteristics of each classified latent class, and categorical data were analyzed using the chi-square test. Continuous data were analyzed using an independent t test or one-way analysis of variance. Finally, hierarchical regression analysis was conducted to examine the effect of the type of OCSs' social engagement on depressive symptoms and life satisfaction.

Results

Participant Demographics

The sample comprised 376 Korean OCSs (see Table 1). Two hundred participants (53%) were female, and 210 (56%) were aged 75 years or older. In addition,

FIGURE 1. Latent Class Analysis of Social Engagement in Older Adults
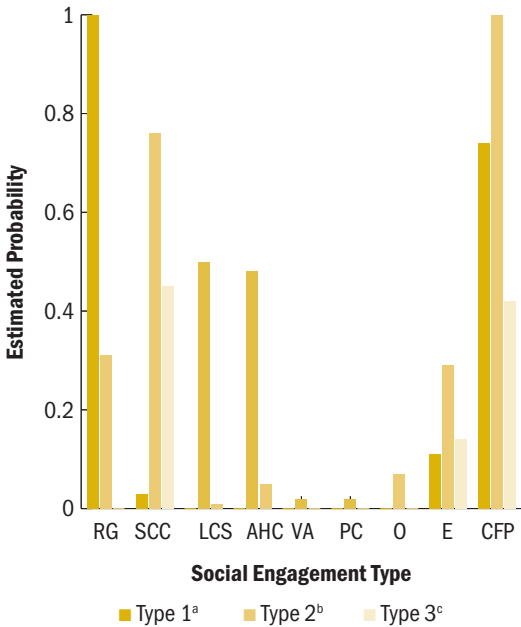
[a] Religiously centered group
[b] Diverse social participation group
[c] Passive participation group
AHC—alumni associations, hometown alliances, or clan gatherings; CFP—contact with familiar people who live close to them 3 or more times a week; E—employed; LCS—leisure, culture, or sports clubs; O—other; PC—political parties or civic organizations; RG—religious gatherings; SCC—social clubs at a senior center; VA—volunteer activities

49% (n = 185) had graduated from elementary school or less. A total of 70% (n = 263) were married, and the average annual household income was 16,954.22 U.S. dollars (SD = 13,915.54). The average ADL score of participants was 0.22 points, and the average IADL score of participants was 0.9 points. Participants with comorbidities comprised 79% (n = 298) of the study sample. Regarding the participants' psychosocial characteristic scores, the average depressive symptoms score was 7.05 points (SD = 6) and the average life satisfaction score was 58.22 points (SD = 60).

LCA of Social Engagement Type

This study identifies an empirical typology of social engagement and its association with depressive symptoms and life satisfaction among OCSs. An LCA was conducted to identify the empirical typology of social engagement. The comparison results of the model fits are presented in Table 2. The model fit index was

TABLE 3. Demographic Differences According to Social Engagement Type (N = 376)

Characteristic	Type 1 (N = 35)		Type 2 (N = 42)		Type 3 (N = 299)		χ²/F	p
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD		
Annual household income ($)[a]	20,331.15	18,053.9	22,938.94	16,446.69	15,716	12,677.06	6.266	0.002*
Activities of daily living[b]	–	–	–	–	0.28	1.17	2.207	0.111
Instrumental activities of daily living[c]	0.51	1.15	0.12	0.5	1.06	2.54	3.644	0.027**
Depressive symptoms[d]	6.17	5.11	4.52	4.95	8.05	5.7	8.556	< 0.001***
Life satisfaction[e]	59.14	18.21	61.9	16.42	57.59	17.31	1.2	0.302

Characteristic	n	%	n	%	n	%	χ²/F	p
Gender							12.246	0.002
Female	28	80	18	43	154	52	–	–
Male	7	20	24	57	145	48	–	–
Age (years)							8.471	0.014
65–74	19	54	26	62	121	40	–	–
75 or older	16	46	16	38	178	60	–	–
Educational attainment status							13.056	0.042
Elementary school or less	15	43	12	29	158	53	–	–
Middle school	5	14	8	19	41	14	–	–
High school	13	37	14	33	76	25	–	–
University or more	2	6	8	19	24	8	–	–
Marital status							3.069	0.8
Married	22	63	31	74	210	70	–	–
Single[f]	13	37	11	26	89	30	–	–
Comorbidity[g]							6.942	0.9
Yes	30	86	27	64	241	81	–	–
No	5	14	15	36	58	19	–	–
Employment status							6.428	0.04
Not employed	31	89	30	71	257	86	–	–
Employed	4	11	12	29	42	14	–	–
Participating in religious gatherings							295.397	< 0.001
Yes	35	100	13	31	–	–	–	–
No	–	–	29	69	299	100	–	–
Participating in social clubs at a senior center							41.661	< 0.001
No	34	97	10	24	163	55		
Yes	1	3	32	76	136	45	–	–
Participating in leisure, culture, or sports clubs							150.583	< 0.001
No	35	100	21	50	296	99	–	–
Yes	–	–	21	50	3	1	–	–

Continued on the next page

TABLE 3. Demographic Differences According to Social Engagement Type (N = 376) *(Continued)*

Characteristic	Type 1 (N = 35)		Type 2 (N = 42)		Type 3 (N = 299)		χ^2/F	p
	n	%	n	%	n	%		
Participating in alumni associations, hometown alliances, or clan gatherings							80.081	< 0.001
No	35	100	22	52	283	95	–	–
Yes	–	–	20	48	16	5	–	–
Participating in volunteer activities							7.974	0.019
No	35	100	41	98	299	100	–	–
Yes	–	–	1	2	–	–	–	–
Participating in political parties or civic organizations							7.974	0.019
No	35	100	41	98	299	100	–	–
Yes	–	–	1	2	–	–	–	–
Participating in others							24.049	< 0.001
No	35	100	39	93	299	100	–	–
Yes	–	–	3	7	–	–	–	–
Frequency of contact with familiar people who live close to them							57.231	< 0.001
Less than 3 times a week	9	26	–	–	173	58	–	–
3 or more times a week	26	74	42	100	126	42	–	–

* Type 2 > type 3; ** type 3 > type 2; *** type 3 > type 1, type 2
[a] Reflected the converted value from Korean currency to U.S. dollars (1 U.S. dollar was about 1,300 Korean won)
[b] Range = 0–7
[c] Range = 0–10
[d] Range = 10–38
[e] Range = 0–90
[f] Including separated, divorced, or widowed
[g] Excluding cancer
Note. Type 1 is religiously centered group, type 2 is diverse social participation group, and type 3 is passive participation group.

compared by increasing the number of latent classes from two to four, and the final latent class model was determined by comprehensively considering various fitness indices. The results showed that when the type of latent class increased from two to three models, the values of AIC and saBIC decreased. In contrast, they increased when the number of models increased from three to four. Even though the BIC value with a two-class model was the lowest, it is difficult to say that it had distinct characteristics of the class. The entropy value of the three-class model was 0.832, indicating excellent quality of the latent class. The AIC and saBIC values of the three-class models were

the lowest and significant in the bootstrap likelihood ratio test (p < 0.001). In addition, at least 5% of participants were classified among each class.

By comprehensively judging the interpretability of several types, the final number of latent class models was determined to be the three-class model. The best-fitting LCA used in this study is shown in Figure 1. In the three-class model, types 1, 2, and 3 recorded classification rates of 9%, 11%, and 80%, respectively. Type 1 presents a 100% conditional probability of having religious gatherings. Accordingly, type 1 was named "religiously centered group." Type 2 presented a 31% conditional probability of participating in a

religious gathering; 76% in a social club at a senior center; 50% in a leisure, culture, or sports club; 48% in an alumni association, a hometown alliance, or a clan gathering; and 2% in volunteer activities and political parties or civic organizations. A total of 29% of the participants were employed, which was the highest percentage among all types. In addition, they presented a 100% conditional probability of contacting a close social network three or more times a week. Accordingly, type 2 was named "diverse social participation group." Finally, in type 3, the overall conditional probability of social engagement was low.

TABLE 4. Influencing Factors of Depressive Symptoms and Life Satisfaction

Variable	Model 1					Model 2				
	B	SE	β	t	p	B	SE	β	t	p
Depressive symptoms										
(constant)	16.258	1.371	–	11.856	< 0.001	16.617	1.362	–	12.2	< 0.001
Gender (ref: male)	0.006	0.144	0.002	0.043	0.966	–0.003	0.145	–0.001	–0.02	0.984
Age (ref: 65–74 years)	1.018	0.571	0.091	1.781	0.076	0.877	0.567	0.079	1.548	0.123
Educational attainment status	–0.488	0.285	–0.094	–1.717	0.087	–0.409	0.283	–0.079	–1.445	0.149
Annual household income	–	–	–0.071	–1.347	0.179	–	–	–0.053	–1.014	0.311
IADLs	0.691	0.118	0.289	5.837	< 0.001	0.651	0.118	0.272	5.522	< 0.001
Type 1[a] (ref: type 3[c])	–	–	–	–	–	–0.463	0.941	–0.024	–0.492	0.623
Type 2[b] (ref: type 3[c])	–	–	–	–	–	–2.755	0.873	–0.157	–3.155	0.002
Life satisfaction										
(constant)	48.612	4.177	–	11.639	< 0.001	48.704	4.202	–	11.589	< 0.001
Gender (ref: male)	–0.038	0.438	–0.004	–0.086	0.931	–0.01	0.447	–0.001	–0.023	0.981
Age (ref: 65–74 years)	0.544	1.74	0.016	0.313	0.755	0.484	1.749	0.014	0.276	0.782
Educational attainment status	2.708	0.867	0.166	3.124	0.002	2.756	0.874	0.169	3.155	0.002
Annual household income	0.002	–	0.245	4.805	< 0.001	0.002	–	0.249	4.822	< 0.001
IADLs	–1.783	0.36	–0.238	–4.945	< 0.001	–1.802	0.364	–0.241	–4.956	< 0.001
Type 1[a] (ref: type 3[c])	–	–	–	–	–	–1.251	2.903	–0.021	–0.431	0.667
Type 2[b] (ref: type 3[c])	–	–	–	–	–	–1.011	2.694	–0.018	–0.375	0.708

[a] Religiously centered group
[b] Diverse social participation group
[c] Passive participation group
IADLs—instrumental activities of daily living; ref—reference; SE—standard error
Note. For depressive symptoms, R^2 = 0.13 for model 1 and 0.153 for model 2; adjusted R^2 = 0.118 for model 1 and 0.136 for model 2; and F = 11.025 (p < 0.001) for model 1 and 9.467 (p < 0.001) for model 2.
Note. For life satisfaction, R^2 = 0.175 for model 1 and 0.176 for model 2; adjusted R^2 = 0.164 for model 1 and 0.16 for model 2; and F = 15.727 (p < 0.001) for model 1 and 11.223 (p < 0.001) for model 2.
Note. In regression analysis, "constant" represents the intercept in the regression model, indicating the baseline value of the dependent variable when the independent variables are 0.

Therefore, type 3 was named the "passive participation group."

Demographic Differences According to Social Engagement Type

Demographic differences according to social engagement type are presented in Table 3. Social engagement types were significantly different in terms of gender (p = 0.002), age (p = 0.014), educational attainment status (p = 0.042), annual household income (p = 0.002), IADLs (p = 0.027), and depressive symptoms (p < 0.001). In the case of men, the diverse social participation group was the highest at 57%, whereas among women, the religiously centered group was the highest at 80%. For participants aged 65–74 years, the diverse social participation group was the highest at 62%, and for those aged older than 75 years, the passive participation group was the highest at 60%. Regarding educational attainment status of the passive participation group, the highest was the elementary school graduation or less group at 53%. Annual household income was found to be highest in the diverse social participation group ($\overline{X}$ = 22,938.94 U.S. dollars, SD = 16,446.69), followed by the religiously centered group ($\overline{X}$ = 20,331.15 U.S. dollars, SD = 18,053.90) and the passive participation group ($\overline{X}$ = 15,716.00 U.S. dollars, SD = 12,677.06). These post hoc tests showed that the diverse social participation group had significantly higher annual household incomes compared to the passive participation group (F = 6.266, p = 0.002).

In terms of health-related characteristics, the IADL score of the passive participation group ($\overline{X}$ = 1.06, SD = 2.54) was significantly higher than that of the diverse social participation group ($\overline{X}$ = 0.12, SD = 0.5) (F = 3.644, p = 0.027). In the case of comorbidity, it was lower in the diverse social participation group (64%), then higher in the passive participation group (81%), and highest in the religiously centered group (86%), but these were not statistically significant.

As a result of validating the differences in depressive symptoms and life satisfaction according to psychosocial characteristics, depressive symptoms scored 6.17 points (SD = 5.11) in the religiously centered group, 4.52 points (SD = 4.95) in the diverse social participation group, and 8.05 points (SD = 5.7) in the passive participation group. The passive participation group was found to have statistically significant higher depressive symptoms than the religiously centered group and diverse social participation group (F = 8.556, p < 0.001). There was no statistically significant difference in life satisfaction scores among the three types of social engagement (F = 1.2, p = 0.302).

KNOWLEDGE TRANSLATION

- The following three classes were identified in older cancer survivors: a religiously centered group, a diverse social participation group, and a passive participation group.
- Social engagement types differed significantly in terms of gender, age, educational attainment status, annual household income, instrumental activities of daily living, and depressive symptoms.
- Results suggest that certain factors place older cancer survivors at high risk for depressive symptoms; these risk factors can guide tailored interventions.

The Effect of the LCA Class on Depressive Symptoms and Life Satisfaction

Hierarchical regression was performed to identify the factors that affect depressive symptoms and life satisfaction of OCSs. To compare the explanatory power and identify the influence of each variable, those with significant adjustments were entered as independent variables in the regression model. Demographic characteristics were entered into model 1 and social engagement type into model 2 (see Table 4). As a result of examining the variance inflation factor value to validate multicollinearity between major variables, it was determined that the variance inflation factor of all variables was less than 10, thus eliminating the multicollinearity problem. When the passive participation group was used as the reference group, the depressive symptoms of the diverse social participation group were found to be significantly lower (β = –0.157, p = 0.002). No social engagement type had a statistically significant effect on life satisfaction.

Discussion

This study used LCA to classify the types of social engagement in OCSs and the impact of different types of social engagement on depressive symptoms and life satisfaction. In addition, it identified the types of social engagement by comprehensively considering not only the types of social activity, but also employment status and the frequency of contact with a close social network.

The social engagement types of OCSs were classified into the following three types: religiously centered group, diverse social participation group, and passive participation group. The passive participation group included the largest number of participants, which can be attributed to the low participation of Korean cancer survivors in social activities (Kang, 2017). The religiously centered group and passive participation

group included 89% of the total participants, and they rarely participated in diverse social activities except for religious gatherings and social clubs at a senior center. It is known that older adults in Korea participate in an average of 1.5–1.6 social activities, but their social engagement was generally not diverse and was mostly concentrated in social clubs and religious gatherings (Lee, 2020).

The diverse social participation group included the greatest proportion of participants aged 65–74 years, and the passive participation group included the greatest proportion of participants aged 75 years or older. This is consistent with a previous study of older adults that found that the "friendly social participation type" is concentrated between the ages of 65 and 74 years, and the "negative social participation type" is evenly distributed between the ages of 65 and 79 years (Kim et al., 2021). Older adults gradually withdraw from their social roles, and their level of social engagement decreases (Kadambi et al., 2020). As people age, it is probable that they will naturally move from the diverse social participation group to the passive participation group. In the study, the passive participation group had the highest proportion of individuals aged older than 75 years who had completed elementary school or less. This aligns with previous research, which has shown that older age, lower education, and unemployment are associated with reduced social engagement in older adults (Cheng et al., 2023). Therefore, community nurses should be able to identify those in need of intervention by considering the characteristics of OCSs who have low social engagement.

Unlike ADLs, IADLs showed significant differences according to the type of social engagement. ADLs include activities that take place within the household, such as getting dressed, bathing, and eating, whereas IADLs encompass activities outside the home such as short-distance outings, transportation, and shopping (Lee & Hur, 2021). In this study, the passive participation group showed the highest scores in IADLs. In the subsequent research, it is important to further investigate the relationship between these IADL scores and social engagement, to ascertain whether low social participation is because of difficulties such as mobility issues. A previous study found that internet-based peer support programs and social media platforms allowed patients to create social networks to exchange information and personal stories regarding their illness and obtain social support from their peers (Kadambi et al., 2020). Community nurses should consider the characteristics of OCSs with low social activity engagement to identify those in need of assistance and provide necessary interventions using various methods.

Regarding examining depressive symptoms by engagement type, scores were lowest in the diverse social participation group and increased progressively in the religiously centered group and passive participation group. This result concurs with a previous study showing that people who interact with other people, such as family or friends, are less likely to experience depressive symptoms (Guo et al., 2022). In contrast, Kim and Min (2022) observed conflicting results showing that older adults' depressive symptoms in the "high-frequency complex activity group" were relatively higher than the "low-frequency religious-centered group." This can be inferred because the present study included more diverse social engagement variables by adding employment status and contact with a close social network, along with social activities. The diverse social participation group not only participated in the most social activities, but also showed a 100% conditional-response probability to contact a close social network three or more times a week. Generally, OCSs spend a lot of time with their spouses, friends, neighbors, and acquaintances, who can actively participate in treatment and rehabilitation (Kadambi et al., 2020). The depressive symptoms of OCSs are affected by the interruption of existing limited social activities, economic difficulties, and psychosocial factors, regardless of the cancer diagnosis (Won, 2019). Therefore, it is necessary to analyze them using various methods and, as much as possible, maintain social engagement in a pattern similar to that before cancer diagnosis.

In the diverse social participation group, the number of participants who were employed was the highest compared to the other types. In this study, the depressive symptoms in the diverse social participation group were lower than those of the passive participation group. Among cancer survivors, maintaining employment restores social relationships and has a positive effect on their overall physical and mental health (Suh & Lee, 2012). However, one study found that employment negatively affects life satisfaction among older adults (Shim, 2015). Korea has the highest older adult poverty rate compared to the total population poverty rate among countries in the Organisation for Economic Co-operation and Development (Cho et al., 2016). To classify whether people work to enjoy old age as a form of social leisure or to maintain their economic livelihood (out of financial necessity), more specific LCA of variables is needed in future studies.

Limitations

First, this study focused on Korean OCSs and used Korean language. This limits the generalizability to other populations. Second, because it was a secondary data study, there were limitations in identifying various variables. The authors used only data from 2020, making it impossible to confirm participants' previous marital status or whether they had other family members who relied on them. Third, there may be differences in depressive symptoms, life satisfaction, and social participation based on the type of cancer diagnosed and the individual's survival period. In future studies, categorizing and classifying social engagement according to cancer type and survival period will be helpful in providing more specific interventions and services.

Implications for Nursing

First, it is necessary to develop a social participation program that considers the diversity of OCSs. This study found differences in the types of latent classes according to the sociodemographic, health-related, and psychosocial characteristics of OCSs, and the effects on depressive symptoms varied depending on the latent class type. Customized programs are needed to allow OCSs to participate in various social activities based on their characteristics.

Second, more support is needed to revitalize the social engagement of OCSs. In this study, social activities involving participants were limited to religious gatherings and participation in social clubs. Activities involving leisure, culture, sports, and volunteering were difficult to identify. Infrastructure should be established to facilitate diverse social activities. It is well documented that, compared to non-Hispanic White individuals, patients of racial or ethnic minority groups are likely to have a smaller social network and their networks are likely to focus on family and kin relationships, particularly among Asian Americans (Dong & Chang, 2017; Park et al., 2015). It is necessary to provide and enhance a variety of community cultural centers so that OCSs can participate in diverse social activities according to their needs.

Conclusion

This study focuses on under-researched Korean OCSs, of whom there is limited knowledge. The study highlights the useful application of LCA for data analysis. The findings suggest that the social engagement of OCSs can be categorized into three distinct subgroups, which is meaningful. These results aid in the development of a strategy for social engagement to manage depressive symptoms and enhance life satisfaction among OCSs more effectively.

Kisook Kim, RN, PhD, is a professor and **Hyohyeon Yoon, RN,** is a graduate student, both in the Department of Nursing at Chung-Ang University in Seoul, Korea. Yoon can be reached at gysl67245@naver.com, with copy to ONFEditor@ons.org.

REFERENCES

Amagasa, S., Fukushima, N., Kikuchi, H., Oka, K., Takamiya, T., Odagiri, Y., & Inoue, S. (2017). Types of social participation and psychological distress in Japanese older adults: A five-year cohort study. *PLOS ONE, 12*(4), e0175392. https://doi.org/10.1371/journal.pone.0175392

Andresen, E.M., Malmgren, J.A., Carter, W.B., & Patrick, D.L. (1994). Screening for depression in well older adults: Evaluation of a short form of the CES-D (Center for Epidemiologic Studies Depression Scale). *American Journal of Preventive Medicine, 10*(2), 77–84.

Barnes, P.A., Mayo-Gamble, T.L., Harris, D., & Townsend, D. (2018). Correlation between personal health history and depression self-care practices and depression screening among African Americans with chronic conditions. *Preventing Chronic Disease, 15*, E149. https://doi.org/10.5888/pcd15.170581

Chao, S.-F. (2016). Changes in leisure activities and dimensions of depressive symptoms in later life: A 12-year follow-up. *Gerontologist, 56*(3), 397–407. https://doi.org/10.1093/geront/gnu052

Cheng, M., Su, W., Li, H., Li, L., Xu, M., Zhao, X., . . . Yang, L. (2023). Factors influencing the social participation ability of rural older adults in China: A cross-sectional study. *Frontiers in Public Health, 10*, 1001948. https://doi.org/10.3389/fpubh.2022.1001948

Cho, J., Lee, A., & Woo, K. (2016). A comparative study on retirement process in Korea, Germany, and the United States: Identifying determinants of retirement process. *International Journal of Aging and Human Development, 83*(4), 441–467. https://doi.org/10.1177/0091415016657556

Chun, S., Lee, S., Heo, J., Ryu, J., & Lee, K.H. (2022). Leisure activity, leisure satisfaction, and hedonic and eudaimonic well-being among older adults with cancer experience. *Psychological Reports, 332941221123236*. https://doi.org/10.1177/00332941221123236

Collins, L.M., & Lanza, S.T. (2010). *Latent class and latent transition analysis: With applications in the social, behavioral, and health sciences*. John Wiley and Sons.

Croezen, S., Avendano, M., Burdorf, A., & van Lenthe, F.J. (2015). Social participation and depression in old age: A fixed-effects analysis in 10 European countries. *American Journal of Epidemiology, 182*(2), 168–176. https://doi.org/10.1093/aje/kwv015

Dong, X., & Chang, E.-S. (2017). Social networks among the older Chinese population in the USA: Findings from the PINE study. *Gerontology, 63*(3), 238–252. https://doi.org/10.1159/000455043

Guo, Y., Qin, W., & Lee, H.Y. (2022). Social participation and depressive symptoms in older African American cancer survivors: A comparison with non-cancer subjects. *Aging and Mental Health, 26*(8), 1558–1563. https://doi.org/10.1080/13607863.2021.1950619

Hamilton, J.B., Deal, A.M., Moore, A.D., Best, N.C., Galbraith, K.V., & Muss, H. (2013). Psychosocial predictors of depression among older African American patients with cancer. *Oncology Nursing Forum, 40*(4), 394–402. https://doi.org/10.1188/13.ONF.394-402

Heo, J., Chun, S., Lee, S., & Kim, J. (2016). Life satisfaction and psychological well-being of older adults with cancer experience: The role of optimism and volunteering. *International Journal of Aging and Human Development, 83*(3), 274–289. https://doi.org/10.1177/0091415016652406

Hyun, J.W., Kim, Y., & Choi, M. (2021). Trajectories and prediction factors of depression in elderly cancer survivors: Using the Korean Longitudinal Study of Ageing. *Asian Oncology Nursing, 21*(3), 155–162. https://doi.org/10.5388/aon.2021.21.3.155

Ju, Y.J., Han, K.-T., Lee, T.-H., Kim, W., Kim, J., & Park, E.-C. (2016). Does relationship satisfaction and financial aid from offspring influence the quality of life of older parents?: A longitudinal study based on findings from the Korean longitudinal study of aging, 2006–2012. *Health and Quality of Life Outcomes, 14*(1), 108. https://doi.org/10.1186/s12955-016-0509-4

Kadambi, S., Soto-Perez-de-Celis, E., Garg, T., Loh, K.P., Krok-Schoen, J.L., Battisti, N.M.L., . . . Hsu, T. (2020). Social support for older adults with cancer: Young international society of geriatric oncology review paper. *Journal of Geriatric Oncology, 11*(2), 217–224. https://doi.org/10.1016/j.jgo.2019.09.005

Kang, H. (2017). Factors influencing insufficient physical activity in older cancer patients: Using 2014 survey of living condition of elderly study. *Journal of the Korea Contents Association, 17*(12), 558–568. https://doi.org/10.5392/JKCA.2017.17.12.558

Kang, M.J., Won, Y.-J., Lee, J.J., Jung, K.-W., Kim, H.-J., Kong, H.-J., . . . Seo, H.G. (2022). Cancer statistics in Korea: Incidence, mortality, survival, and prevalence in 2019. *Cancer Research and Treatment, 54*(2), 330–344. https://doi.org/10.4143/crt.2022.128

Kim, E.-J., & Min, J. (2022). Patterns of social participation and depressive symptoms among older adults with and without a spouse. *Health and Social Welfare Review, 42*(3), 172–189. https://doi.org/10.15709/hswr.2022.42.3.172

Kim, M.-K. (2022). The effect of economic and social activities on life satisfaction of the elderly: Focusing on the mediating effect of health conditions. *Journal of Korean Association for Learner-Centered Curriculum and Instruction, 22*(17), 249–264. http://doi.org/10.22251/jlcci.2022.22.17.249

Kim, S., Lee, S.H., Namkung, E.A., Lee, Y., Baek, H., Shin, H.-R., & Lee, S.-W. (2021). *Changes in the lives and perceptions of the elderly in Korea: National survey of older Koreans*. Korea Institute for Health and Social Affairs. https://doi.org/10.23060/kihasa.a.2021.23

Kim, S., & Oh, H.I. (2022). Work history of the elderly under poverty. *Korean Journal of Social Welfare Studies, 53*(3), 71–112. https://doi.org/10.16999/kasws.2022.53.3.71

Kim, S.B. (2018). A study on the effect of social participation activities on the level of life satisfactions among the elderly—Focusing on mediating effect of depression. *Journal of Humanities and Social Sciences 21, 9*(3), 115–129. https://doi.org/10.22143/HSS21.9.3.10

Kim, Y.H. (2020). Depression in middle-aged and elderly people with pain: A latent profile analysis. *Journal of Muscle and Joint Health, 27*(3), 325–332. https://doi.org/10.5953/JMJH.2020.27.3.325

Korea Employment Information Service. (2020). *User's guide for the 2020 Korean Longitudinal Study of Ageing (KLoSA)*. Employment Survey and Analysis Center. https://survey.keis.or.kr/eng/klosa/userguide/List.jsp

Lanza, S.T., & Rhoades, B.L. (2013). Latent class analysis: An alternative perspective on subgroup analysis in prevention and treatment. *Prevention Science, 14*(2), 157–168. https://doi.org/10.1007/s11121-011-0201-1

Lee, H.Y., Kim, J., & Sharratt, M. (2018). Technology use and its association with health and depressive symptoms in older cancer survivors. *Quality of Life Research, 27*(2), 467–477. https://doi.org/10.1007/s11136-017-1734-y

Lee, M.H., & Ko, J.E. (2015). The impact of social capital on aging problems among community-living older adults. *Korean Journal of Social Welfare Studies, 17*(3), 85–110. http://doi.org/10.22944/kswa.2015.17.3.004

Lee, S.B., & Hur, N.-W. (2021). A study on the determinants of the elderly's ADL/IADL: Focused on the comparison of urban and rural areas. *Journal of the Korean Society of Industrial-Academic Technology, 22*(4), 419–429. http://doi.org/10.5762/KAIS.2021.22.4.419

Lee, S.E. (2016). Factors associated with life satisfaction among older adults in Korea according to living arrangements. *Korean Journal of Adult Nursing, 28*(6), 659–668. https://doi.org/10.7475/kjan.2016.28.6.659

Lee, Y. (2020). *2020 survey on senior citizens*. Korea Institute for Health and Social Affairs. Retrieved February 22, 2020, from https://www.kihasa.re.kr/publish/report/view?searchText=%EB%85%B8%EC%9D%B8&page=2&type=all&seq=37736

Miller, K.D., Nogueira, L., Devasia, T., Mariotto, A.B., Yabroff,

K.R., Jemal, A., . . . Siegel, R.L. (2022). Cancer treatment and survivorship statistics, 2022. *CA: A Cancer Journal for Clinicians, 72*(5), 409–436. https://doi.org/10.3322/caac.21731

Min, J. (2013). Effect of social engagement on self-rated health trajectory among Korean older adults. *Health and Social Welfare Review, 33*(4), 105–123. http://doi.org/10.15709/hswr.2013.33.4.105

Muthén, B. (2004). Latent variable analysis: Growth mixture modeling and related techniques for longitudinal data. In D. Kaplan (Ed.), *Handbook of quantitative methodology for the social sciences* (pp. 345–368). Sage. https://doi.org/10.4135/9781412986311.n19

Nakajima, H., Morita, A., Kanamori, S., Aida, J., & Fujiwara, T. (2022). The frequency of job participation and well-being of older people in Japan: Results from JAGES study. *Archives of Gerontology and Geriatrics, 102,* 104720.

Park, M.-J. (2017). Effect of latent class typologies of social activities on depression among older adults: Comparison between poverty and non-poverty groups. *Elderly Welfare Research, 72*(2), 191–214. http://doi.org/10.21194/kjgsw.72.2.201706.191

Park, N.S., Jang, Y., Lee, B.S., Ko, J.E., Haley, W.E., & Chiriboga, D.A. (2015). An empirical typology of social networks and its association with physical and mental health: A study with older Korean immigrants. *Journals of Gerontology, Series B: Psychological Sciences and Social Sciences, 70*(1), 67–76. https://doi.org/10.1093/geronb/gbt065

Park, Y., Baik, S.Y., Kim, H.-S., & Lee, S.-H. (2017). The influence of traditional culture and the interpersonal psychological theory on suicide research in Korea. *Psychiatry Investigation, 14*(6), 713–718. https://doi.org/10.4306/pi.2017.14.6.713

Sapp, A.L., Trentham-Dietz, A., Newcomb, P.A., Hampton, J.M., Moinpour, C.M., & Remington, P.L. (2003). Social networks and quality of life among female long-term colorectal cancer survivors. *Cancer, 98*(8), 1749–1758. https://doi.org/10.1002/cncr.11717

Shim, O.S. (2015). Moderating effects of depression on the relationship between work and life-satisfaction of the elderly economic activity. *Korean Care Management Research, 17,* 161–180.

Statistics Korea. (2020). *Statistics on the aged* (2020). https://bit.ly/3RvkTEq

Suh, K.S., & Lee, Y.J. (2012). The effects of self-esteem, life satisfaction, and social participation desire on the social participation of the elderly. *Korean Journal of Social Issues, 13*(2), 97–124.

Sung, H.-Y., & Cho, H.-S. (2006). Productive activities and psychological well-being in the elderly. *Journal of the Korean Home Economics Association, 44*(6), 35–45.

Torp, S., Paraponaris, A., Van Hoof, E., Lindbohm, M.-L., Tamminga, S.J., Alleaume, C., . . . de Boer, A.G.E.M. (2019). Work-related outcomes in self-employed cancer survivors: A European multi-country study. *Journal of Occupational Rehabilitation, 29*(2), 361–374. https://doi.org/10.1007/s10926-018-9792-8

Wang, Y., Chen, Z., & Zhou, C. (2021). Social engagement and physical frailty in later life: does marital status matter? *BMC Geriatrics, 21,* 248. https://doi.org/10.1186/s12877-021-02194-x

Won, G. (2019). *The effect of health characteristics and social network of middle-aged and elderly cancer survivors on quality of life* [Master's thesis, Ewha Womans University]. https://dspace.ewha.ac.kr/handle/2015.oak/248544