Self-Management of Rural Adults with Multimorbidity: A Cross-Sectional Descriptive Study

Jessica J. Miller, PhD, APRN, AGPCNP-BC[1*]

Susan A. Barnason, PhD, RN, APRN-CNS, CCRN, CEN, FAEN, FAHA, FAAN[2]

Myra Schmaderer, PhD, RN[3]

Christine Eisenhauer, PhD, RN, APRN-CNS, PHCNS-BC, CNE[4]

Kevin A. Kupzyk, PhD[5]

Bunny Pozehl, PhD, RN, APRN-NP, FHFSA, FAHA, FAAN[6]

[1] Assistant Professor, College of Nursing, University of Nebraska Medical Center, jessica.miller@unmc.edu

[2] Professor, College of Nursing, Lincoln Division, University of Nebraska Medical Center, sbarnaso@unmc.edu

[3] Associate Professor, College of Nursing, Lincoln Division, University of Nebraska Medical Center, mschmade@unmc.edu

[4] Community Partner, cme7f6@gmail.com

[5] Assistant Professor, College of Nursing, Omaha Division, University of Nebraska Medical Center, kevin.kupzyk@unmc.edu

[6] Professor, College of Nursing, Omaha Division, University of Nebraska Medical Center, bpozehl@unmc.edu

[*]Correspondence: Jessica J. Miller

Abstract

Purpose: The purpose of this study was to examine self-management of rural dwelling adults with multimorbidity.

Sample: Participant sample (N=40) was recruited from 5 primary care clinics located in rural communities in the Midwestern United States. All participants resided in isolated rural communities based on zip code of residence (RUCA: 10).

Methods: This cross-sectional descriptive study measured four self-management outcomes (self-efficacy, social support, self-regulation, patient activation) and perceptions of rural community dwelling adults with multimorbidity (N=40). All participants resided in rural/isolated rural communities designated as RUCA 10 (Rural-Urban Commuting Area [RUCA] code).

Findings: Study sample was primarily female (n=32), Caucasian (n=40), with a mean age of 62.13 years of age (range 37-90). Participants self-reported multimorbidity (2 – 7 chronic conditions) differed significantly from care-based (ICD-10 medical record) multimorbidity (range of 2 – 11 chronic conditions). This sample self-reported high levels of self-efficacy, patient activation, and social support. However, low self-regulation ability was noted in this sample. Participants perceptions of multimorbidity focused primarily on the emotional effects and prioritization required for daily management.

Conclusion: Findings from this study elucidate the self-management outcomes and perceptions of rural community dwelling adults with multimorbidity giving a voice to this population to better inform development of interventions tailored to their contextual needs.

Keywords: Rural, Health Disparity, Self-management, Self-Care, Multimorbidity, Multiple Chronic Conditions

Self-Management of Rural Adults with Multimorbidity: A Cross-Sectional Descriptive Study

Despite healthcare advances, multimorbidity has accelerated during the past 25 years, affecting over 60% of adults globally in high income countries (King et al., 2018; Ofori-Asenso et al., 2019). Multimorbidity is associated with negative health outcomes, functional and cognitive decline, reduced quality of life, increased health care costs, hospitalization, and mortality (Boersma et al., 2020; Bratzke et al., 2015; King et al., 2018; Larkin et al., 2021; Moin et al., 2021; Noël et al., 2007; Ofori-Asenso et al., 2019; Picco et al., 2016). Multimorbidity disproportionately affects older and rural dwelling adults, females, and persons of low socioeconomic status (Boersma et al., 2020; King et al., 2018; Larkin et al., 2021; Moin et al., 2021; Ofori-Asenso et al., 2019; Picco et al., 2016).

Care for patients with multimorbidity is especially challenging, often requiring many providers and nurses implementing disease-specific treatment plans (Buffel du Vaure et al., 2016; Ofori-Asenso et al., 2019). Unfortunately, a provider's overall treatment plan for patients with multimorbidity is often a combination of individual treatment plans for each chronic condition (Boyd et al., 2005; Boyd & Kent, 2014). This approach lacks an integrated interdisciplinary clinical management plan to support patient adherence to multimorbidity self-care management (Boyd et al., 2005; Ofori-Asenso et al., 2019; Tinetti et al., 2004). Medical management of multimorbidity is complex, necessitating understanding of patient needs and their abilities to manage multimorbidity. This study specifically focused on rural dwelling adults to ascertain their perceptions and needs associated with self-management of multimorbidity.

Needs of Rural Dwelling Adults with Multimorbidity

Rural communities have higher rates of multimorbidity compared to urban areas (34.8% vs. 26.1%) based on Rural-Urban Commuting Area codes (RUCA). Rural communities face unique challenges due to a myriad of factors (geographic isolation, cultural/contextual differences from urbanized areas) and have higher poverty rates, lower educational levels, increased morbidity and mortality, less access to transportation, reduced availability of healthcare resources, and health care worker shortages (Afifi et al., 2022; Robertson et al., 2020). Rural dwelling adults are also less likely to participate in their health care; struggling to enact healthy behaviors (e.g., healthy eating, engaging in physical activity), and adhering to recommended management of chronic conditions (e.g., diet, physical activity; Afifi et al., 2022; Bardach et al., 2011). The urgency to enact strategies specifically targeted for rural adults with multimorbidity was explicated in a recent public health publication: "Rural areas have often been left to adapt interventions designed for urban settings, with little or no consideration of the appropriateness of these programs for a rural setting" (Afifi et al., 2022, p. 142).

Self-Management for Chronic Conditions

Self-management strategies implemented for individual chronic conditions can improve health outcomes that are disease specific (e.g., blood sugar and blood pressure control), reduce exacerbations of illness and hospitalizations, and improve overall management and quality of life (Lorig et al., 1999; Moore et al., 2016). Less is known about individuals from rural areas that have multimorbidity. Self-managing multimorbidity using interventions developed for single chronic conditions is complex, increasing patients' risk for adverse events (e.g., overmedicalization, increased hospitalization, increased patient burden; Ansari, 2018).

Chronic disease self-management programs conducted both in urban and rural settings have shown success at managing single chronic conditions (e.g., diabetes, heart failure, COPD, and mental health disorders; Albai et al., 2017; Alluhaidan et al., 2015; American Association of Diabetes Educators, 2009; Ansari et al., 2020); however, there is a paucity of research reporting self-management of chronic conditions by rural adults with multimorbidity. There is a need to examine the self-management perceptions and self-reported behaviors (sleep quality, physical activity) of rural adults diagnosed with multimorbidity to inform the development of self-management interventions to address specific needs of rural dwelling adults. The development of this study was guided using the Individual and Family Self-Management Theory (Ryan & Sawin, 2009). This study examines the processes of self-management including: (a) self-efficacy, (b) self-regulation, and (c) social support. In addition, this study also examined patient activation as a process of self-management as proposed by Moore et al. (2016).

The purpose of this study was to examine self-management of rural dwelling adults with multimorbidity. Specific aims of this study were to:

Aim 1: Describe self-management outcomes variables of self-efficacy, self-regulation, social support, and patient activation and self-reported physical activity and sleep quality.

Aim 2: Explore perceptions of multimorbidity among rural dwelling adults with multimorbidity.

Methods

Study Design

A descriptive cross-sectional design was used for this study. Data collection methods included self-reported surveys and extraction of data from the patient's medical records. Study approval was obtained from the University Institutional Review Board (Protocol# 690-20-EP). All data were collected between January 2020 and April 2020.

Sample

A convenience sample of rural dwelling adults were recruited from five primary care clinics associated with one health care center located in rural midwestern United States. Potential participants were invited to participate by health care facility nurses, advanced practice registered nurses (APRN), physicians and staff during scheduled health care visits, and if interested, were contacted by the research nurse to be screened for inclusion into the study. Inclusion criteria were:

(a) age 19 years or older; (b) diagnosis of two or more chronic conditions (verified through medical records obtained from the previous 365 days); (c) reside in a rural area (e.g., RUCA 7 to 10); (d) live independently and have the ability to perform activities of daily living; and (e) able to read, write and speak English. Participants were excluded if they had a medical diagnosis of cognitive impairment.

Description of Measures

Data were collected from participants' self-report and medical records. Self-management outcomes measured in this study included: self-efficacy, social support, self-regulation, and patient activation (Table 1; Moore et al., 2016). In addition, self-reported physical activity and sleep quality data were collected (Table 1). Participants' perception of multimorbidity was collected by self-report of the number and type of chronic conditions, and participants responses to the Multimorbidity Illness Perceptions Scale (MULTIPleS). Clinical data of patient multimorbidity was collected from the medical record, and specifically included: blood pressure, pulse, body mass index (BMI), and ICD-10 diagnoses from the previous year.

Table 1

Description of Study Measures

Measure	Description	Scoring
Multimorbidity Illness Perceptions Scale (MULTIPleS) (Gibbons et al., 2013)	22 items, measures perceptions of illness, 5 subscales (treatment burden, prioritization, causal relationship, activity restriction, and emotional representations. This measure is both reliable and valid with α = .81 and a correlation coefficient <.5 (Gibbons et al., 2013).	0-100, Higher scores indicate the presence of perceived impact of multimorbidity
Self-Efficacy for Managing Chronic Disease (Lorig et al., 2001)	6 items, measures level of confidence in self-managing chronic disease, α =.88 – .91 (Korenhof et al., 2022; Lee et al., 2023; Lorig et al., 2001) and a correlation coefficient of .83 (Amtmann et al., 2012; Lorig et al., 2001).	1-10, higher scores indicate higher confidence in managing chronic conditions
Index of Self-Regulation (Fleury, 1998)	9 items, 5-point Likert scale, measures participants ability to self-regulate health behaviors, α = .81-.96 and a correlation coefficient of .69 – .95 (Fleury, 1998; Yeom et al., 2011).	1-6, higher scores >4 indicate higher ability to self-regulate

Measure	Description	Scoring
PROMIS* measures of Social Support Instrumental Informational Companionship	Each scale consisted of 4 items using a 5-point Likert scale, each to measure perceptions of social support. A comparative fit analysis between each measure was .99. Reliability for each measure was as follows: Instrumental support α = .87, Informational support α = 388, and Companionship α = .77. All measures reported a construct validity of p < .001 (Hahn et al., 2014; Hibbard et al., 2005).	29.3 – 63.3, scores ≥50 indicate high support ≤40 indicate low support
Patient Activation Measure (PAM-13) (Hibbard et al., 2005)	13 items, measures a patient's knowledge, skill, and confidence for self-management. Rasch Person separation index .79-.83 in adults with chronic conditions (α = .78 – .89) (Hibbard et al., 2005; Schmaderer et al., 2015; Schmaderer et al., 2016; Zimmerman et al., 2017) with a construct validity of p<.001 (Hibbard et al., 2005; Skolasky et al., 2011).	Scores are categorized into four stages of activation Stage 1 – low activation Stage 2 Stage 3 Stage 4 – high activation
Duke Activity Status Index (DASI) (Fan et al., 2015)	12 items, measures a patients self-reported activity level in metabolic equivalents (METs). Significant criterion and construct validity (p < .05; p < .001) and Cronbach's α = 86 (Fan et al., 2015; Hlatky et al., 1989).	0-58.2, higher scores indicate higher activity level (vigorous activity)
Pittsburgh Sleep Quality Index (PSQI) (Buysse et al., 1989)	11 items (combination of short answer and 4-point Likert scale), measure sleep behaviors and quality of sleep. Internal consistency and construct validity were significant, and a Cronbach's α = .83 reported (Buysse et al., 1989).	0-21, score higher than 5 indicate poor sleep quality

*PROMIS: Patient Reported Outcome Measurement Information System

Data Analyses

IBM SPSS® (Version 27) was used to perform descriptive and inferential statistics. A sample of 40 participants was determined to be appropriate for this cross-sectional descriptive study based on Hertzog (2008) recommendations for pilot, feasibility and acceptabilty studies. Descriptive statistics were conducted to analyze demographics and measures of self-efficacy, self-regulation, social support, and patient activation. A paired samples t-test was conducted to determine if there was a statistically significant difference in the number of chronic conditions reported between patient self-reported and measured/care-based multimorbidity (ICD-10 codes in patient health record). An α < .05 was used to determine significance.

Results

Demographics and Clinical Characteristics

All study participants (N = 40) were Caucasian (100%), primarily female (80%), married (77.5%) non-Hispanic/Latino (95%), and resided in isolated rural communities (RUCA 10). Mean age of the participants was 62.13 years (SD 14.97) ranging from 37 – 90 years. For a complete description of sample demographics refer to Table 2. Sample means are reported for all variables with standard deviations in parentheses.

Table 2

Sample Demographics and Clinical Characteristics

Individual Level Variables	Frequency (N = 40)	Percent (%)
Gender		
Female	32	80%
Male	8	20%
Race		
Caucasian	40	100%
Ethnicity		
Hispanic/Latino	2	5%
Non-Hispanic/Latino	38	95%
Marital Status		
Married	31	77.5%
Single	3	7.5%
Widowed	3	7.5%
Divorced	3	7.5%
Highest Level Education		
High School Graduate/GED	8	20%
Some College (non-Degree)	13	32.5%
Associate degree	11	27.5%
Bachelor’s Degree	6	15%
Master’s Degree	2	5%
Income Level Before Taxes		
Under $20,000	6	15%
$20,000-$39,000	8	20%
$40,000-$59,000	7	17.5%
$60,000-$79,000	7	17.5%
$80,000-$99,000	6	15%
$100,000 or more	6	15%
Employment		
Full Time	14	35%
Part Time	5	12.5%

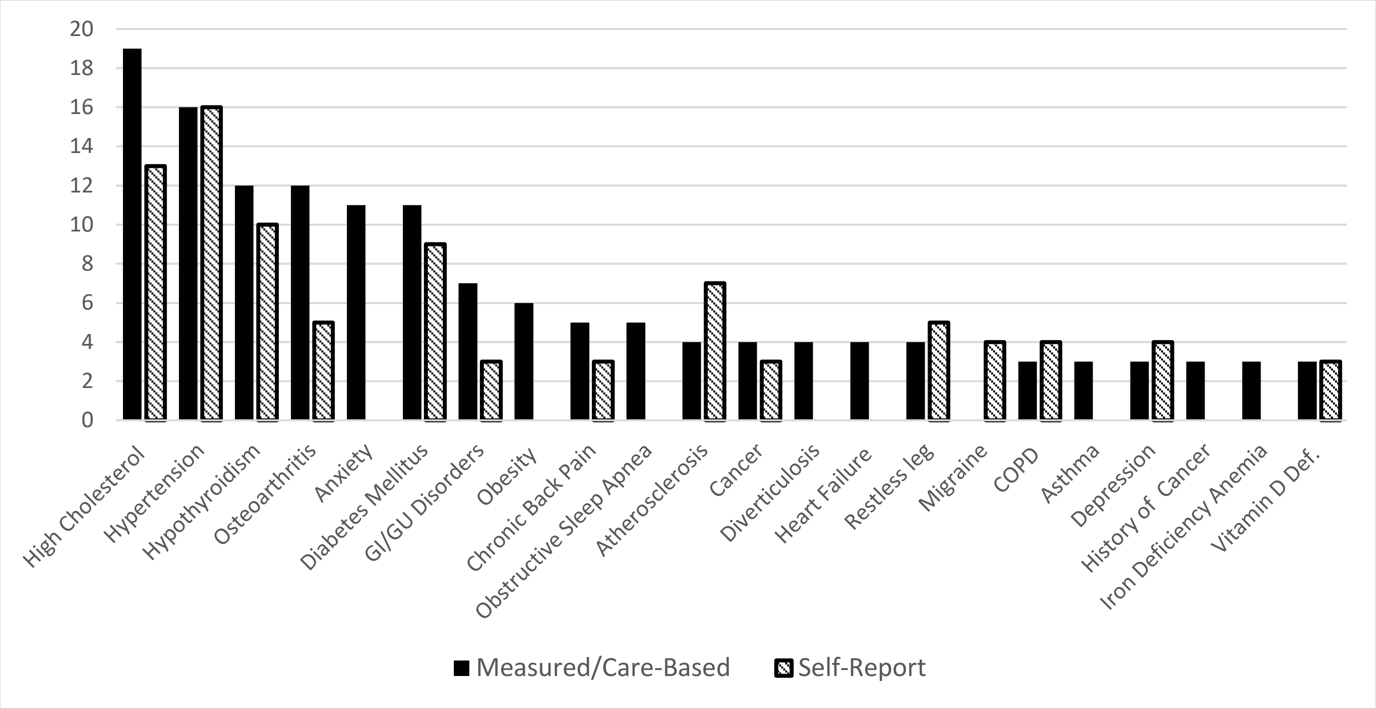
Individual Level Variables	Frequency (N = 40)	Percent (%)
Unemployed	3	7.5%
Retired	18	45%
Medical Insurance		
Medicaid	2	5%
Medicare	20	50%
Disability	1	2.5%
VA/Military	1	2.5%
Private (e.g., Blue Cross, Aetna, etc.)	34	85%
Marketplace (ACA)	2	5%
BMI		
Normal Weight	6	15.0%
Overweight	8	20%
Class 1 Obesity	12	30%
Class 2 Obesity	8	20%
Class 3 Obesity	6	15%

Perceptions of Multimorbidity

In this study, the majority of participants (n = 34), were overweight (n = 8) or obese (n = 26) with a mean BMI of 32.74 kg/m^2 (SD = 6.89). Self-reported multimorbidity ranged from two to seven chronic conditions with 47.5% (n = 19) reporting having only two chronic conditions. In contrast, the measured/care-based multimorbidity (ICD-10 codes) reported from the previous mean was 4.42 (SD = 1.98), with a range of 2–11 chronic conditions reported. There were significant differences in the number of chronic conditions reported between patient self-report and measured/care-based multimorbidity (p < .001). Participants self-reported fewer conditions compared to measured/care-based multimorbidity coded in the medical record. The most common chronic conditions reported by self-reported and measured/care-based multimorbidity are delineated in Figure 1.

Figure 1

Comparison between Self-Reported and Measured/Care-based Multimorbidity



The top three chronic conditions noted in both self-reported and measured/care-based multimorbidity (ICD-10 codes) were hypertension, hypercholesterolemia, and thyroid disorders. Self-reported multimorbidity noted diabetes and heart disease as the top four and five most commonly reported by patients. In contrast, osteoarthritis and anxiety were reported as the fourth and fifth most frequent conditions in the care-based multimorbidity measurement.

Participant perceptions of multimorbidity were measured using the MULTIPleS with a total mean score of 31.55(SD = 12.27). Subscale analysis of the MULTIPleS revealed multimorbidity perceptions were primarily focused on the emotional effects M = 10.93 (6.06) and prioritization of conditions M = 7.4 (SD = 2.5). Other subscale means included perceived treatment burden M = 5.7 (SD = 3.26), causal relationships M = 4.28 (SD = 1.89), and activity restriction M = 3.25 (SD = 2.17; Table 3).

Self-Management Outcomes

This study purposefully examined six self-management outcomes to provide a robust evaluation of the impact of multimorbidity on self-management. Outcomes included: (a) patient activation, (b) self-regulation, (c) self-efficacy, (d) social support, (e) physical activity, and (f) sleep quality. All outcomes were measured using participant self-reported questionnaires.

Patient Activation

The PAM-13 was used to measure patient activation, the sample had a total mean score of 66.0 (SD = 11.76). Participant levels of patient activation varied across all levels or stages of activation: stage 1 (n = 1); stage 2 (n = 6); stage 3 (n = 26); and stage 4 (n = 7).

Self-Regulation

Results from the Index of Self-regulation indicated low regulatory skills M = 3.82 (SD = 0.68). When an individual does not have the ability to self-regulate, they fail to revise self-management behaviors when changes in chronic conditions necessitate more vigorous or alternatively less intensive intervention (Clark et al., 2014).

Self-Efficacy

In contrast to self-regulation participant' self-efficacy scores indicated high confidence when managing their chronic conditions M = 7.08 (SD = 2.03; Table 3). Patients with high self-efficacy have the knowledge and confidence to self-manage their chronic conditions, improving health outcomes and quality of life (Lorig et al., 2001).

Social Support

Three types of social support were measured in this study: instrumental, informational, and companionship using the Patient-Reported Outcomes Measurement System (PROMIS). Instrumental support for this sample indicated high perceived availability of support with material, cognitive, or task performance M = 59.23 (SD = 6.76; Table 3). The sample mean for informational support, measuring perceived availability of helpful information/advise, was one standard deviation above the questionnaire's normative mean M = 60.24 (SD = 6.44). The Companionship measure indicated this sample perceived high availability of someone to share enjoyable social activities M = 57.81 (SD = 6.44).

Physical Activity

Physical activity level was measured using the Duke Activity Status Index in metabolic equivalent tasks (METS). This sample score was reflective of vigorous intensity activity M = 8.18 METs (SD = 2.02; Table 3). MET levels of 3.0 to 6.0 are indicative of moderate activity such as walking at a brisk pace on a level surface (3 – 4.5 mph), completing moderate housework (scrubbing the floor on hands and knees, doing laundry, moving light furniture), or gardening and yardwork (raking the lawn, light shoveling, or weeding while standing/bending). Vigorous intensity activity (> 6.0 METs) is reflective of jogging or running, yardwork such as carrying heavy loads, swinging an ax, pushing a nonmotorized lawn mower, or shoveling heavy snow, and heavy housework such as moving furniture > 75 lbs., moving items 25 lbs. or more up a flight of stairs, or 50 lbs. down a flight of stairs (U.S. Department of Health and Human Services, 1999).

Sleep Quality

The participants' Pittsburg Sleep Quality Index M = 7.48 (SD = 4.57) was indicative of poor sleep quality. In this sample, reported spending an average of 8.34 hours in bed each night with multiple nighttime awakenings and an inability to fall asleep or stay asleep once in bed. External factors reported included getting up to the restroom, disturbances by bed sharing with spouses, and restless legs as contributing to the number of nighttime awakenings.

Table 3

Descriptives for Measures of Self-Management

	Minimum	Maximum	Mean	Std. Deviation	Cronbach's α
MULTIPLES Summary	1.00	67.00	31.55	12.27	.93
Treatment Burden	.00	15.00	5.70	3.25	
Prioritization	1.00	12.00	7.40	2.49	
Causal Relationships	.00	9.00	4.27	1.89	
Activity Restriction	.00	9.00	3.25	2.16	
Emotional Representations	.00	24.00	10.92	6.05	
Self-Efficacy Mean	1.33	10.00	7.08	2.03	.92
Self-Regulation Mean	1.11	5.00	3.82	0.68	.88
Social Support					
Instrumental Support	39.10	63.30	59.23	6.76	.87
Informational Support	43.90	65.60	60.24	6.44	.88
Companionship	42.50	63.10	57.81	6.44	.78
Patient Activation	45.3	100.0	66.00	11.76	.78
DASI	3.94	9.89	8.18	2.02	.88
PSQI	0.0	19.00	7.48	4.57	.87

Note. DASI = Duke Activity Status Index; PSQI = Pittsburg Sleep Quality Index.

Discussion

This study further informs a more comprehensive understanding of self-management outcomes of rural dwelling adults with multimorbidity. This study intentionally measured the four recommended self-management outcomes (Moore et al., 2016). Previous research has only reported each of these outcomes individually as related to improved self-management and has not examined all four outcomes simultaneously or in the population of rural dwelling adults with multimorbidity.

Consistent with previous findings, this study noted a significant difference in the care based multimorbidity (ICD-10 codes) and self-reported multimorbidity. The discrepancy in provider identified (ICD-10 codes) and participant self-report of multimorbidity may be an important consideration by nurses to improve communication about the priority medical conditions as perceived by the patient. Nurses are the primary chronic care managers and often spend a greater amount of time with patients providing education, care, and screening. The health care team needs to be cognizant of the stress and burden experienced with multimorbidity and ensure understanding of the patients perceived self-management abilities and priority concerns to the patients as these may differ from the physician and APRNs identified priority concerns (Freilich et al., 2020). Adults with multimorbidity often experience high levels of stress that are the results of evolving health status, thus requiring day to day self-management, decision making and priority setting (Bratzke et al., 2015). Previous studies evaluating self-management by adults with multimorbidity report the benefits of both patient and health care team agreeing on the expected health outcomes and disease management strategies (Freilich et al., 2020). This allows for prioritization of the health concerns of both the physician/APRN and patient during the chronic care management delivered by nurses in various roles.

In this study 65% (n = 26) of study participants had a patient activation stage 3 (taking action but lacking confidence and skills) contrary to previous studies reporting lower levels of activation among rural adults (Yadav et al., 2020). Findings indicated participants perceived having the knowledge and confidence to manage their chronic condition but struggled to maintain management when under stress (Greene & Hibbard, 2012). In addition, participants in this study reported higher levels of social support which has been reported to be associated with successful self-management and maintenance while under stress (Garnett et al., 2018). Prior research indicates social support for patients with multimorbidity has been directly correlated with increased self-management of their chronic conditions and positive health outcomes (Bardach et al., 2011). Similarly, patients with multimorbidity classified in activation stages 2, 3, and 4 were more successful when implementing self-management behaviors resulting in positive health outcomes (Schmaderer et al., 2016). This study contributes to addressing a gap in the literature by describing the patient activation and perceived social support availability of rural adults with multimorbidity.

Limitations

Results of this study are limited by the cross-sectional descriptive design, as all data were collected at one time point. The sample was recruited from one health care agency limiting generalizability to rural adults in other geographic regions with different cultural characteristics and access to health care resources. This sample consisted entirely of participants from isolated rural communities (RUCA 10). This convenience sample consisted of 100% Caucasian adults and was predominantly female further limiting generalizability beyond this sample. This study is also limited to self-reported findings and may be biased due to social desirability of responses. Objective measures of physical activity and sleep could provide more accurate and unbiased findings (Grimm, 2010). Results of this study should be verified with a larger, more diverse rural sample recruited from multiple geographic regions.

Conclusion

This study informs the body of research explicating self-management of multimorbidity by rural dwelling adults, specifically in isolated rural communities. This cross-sectional descriptive study was specifically designed to examine the recommended self-management outcomes (self-efficacy, social support, patient activation, and self-regulation). Study findings elucidate the importance of considering the perceptions of rural adults living with multimorbidity. Specifically, this study noted significant differences between participant self-reported multimorbidity and measured/care-based multimorbidity. Furthermore, this study describes the self-management across the outcomes of patient activation, social support, self-regulation, and self-efficacy, as well as self-reported physical activity and sleep quality of rural adults with multimorbidity. Future research should consider measurement of self-management behaviors related to diet and medication management and objective measures of physical activity and sleep. This study provides a foundation for future development of self-management interventions tailored specifically for multimorbid rural dwelling adults. In summary, this study gives a voice to rural dwelling adults' perceptions regarding self-management to better inform the development of interventions directly tailored to the contextual needs of rural dwelling adults with multimorbidity.

Conflicts of Interest

The authors declare no conflicts of interest.

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