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Unraveling the subjective well-being of formal and informal caregivers for people with dementia: a comparative analysis

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Abstract

Background Both formal and informal caregivers play pivotal roles in long-term dementia care, demonstrating a shared dedication to providing comprehensive care and support for individuals with dementia. These two caregiver groups exhibit both similarities and differences in their caregiving experiences, contributing to variations in subjective well-being outcomes. However, limited research has compared the psychological well-being and self-rated health of these two caregiver groups, or explored the influencing factors. This knowledge gap hinders the development of targeted interventions and support strategies tailored to different caregiving contexts and informs supportive policymaking.

Methods A cross-sectional survey was conducted among 440 caregivers of individuals with dementia, including 229 informal caregivers and 211 formal caregivers. Psychological well-being was assessed using the short version of Ryff's Psychological Well-being Scale, while self-rated health was measured using a summative item from a validated instrument. Caregiving appraisal and coping were evaluated separately using the Chinese version of the Caregiving Appraisal Scale and Ways of Coping Questionnaire. Descriptive statistics, t-tests, Chi-square tests, and multivariate stepwise regression analyses were employed for data analysis.

Results Formal caregivers exhibited significantly better psychological well-being and self-rated health compared to informal caregivers. Moreover, formal caregivers reported more positive caregiving appraisals than their informal counterparts. However, there was no statistical difference in coping strategies between the two groups. The psychological well-being of informal caregivers was primarily influenced by coping (standardized $\beta = 0.309$) and caregiving mastery (standardized $\beta = 0.270$). For formal caregivers, their psychological well-being was mainly influenced by caregiving satisfaction (standardized $\beta = 0.267$) and caregiving intensity (standardized $\beta = 0.242$). Both informal (standardized $\beta = 0.354$) and formal caregivers' (standardized $\beta = 0.156$) self-rated health were influenced by passive coping.

Conclusions This study provides valuable insights for developing tailored interventions and support systems aimed at improving the psychological well-being and self-rated health of informal and formal caregivers of people with dementia. To enhance the psychological well-being of informal caregivers, interventions targeting improvements in coping skills and caregiving mastery can be designed; while for formal caregivers, interventions focusing

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on enhancing caregiving satisfaction and effective coping strategies may be beneficial. Improving the passive coping and caregiving appraisals may help improve the self-rated health of both groups.

Keywords Subjective well-being, Formal caregivers, Informal caregivers, People with dementia, Self-rated health, Caregiving appraisal, Coping

Background

Currently, there are over 55 million individuals worldwide who suffer from dementia, and nearly 10 million new cases arise annually [1]. Caregiving for persons with dementia can have significant impacts on the health of caregivers, whether they be formal caregivers (such as healthcare professionals and personal care assistants) or informal caregivers (usually family members or friends). The negative impact of caregiving on the physical and mental health of dementia caregivers has been extensively studied; depressive symptoms, anxiety, and decreased quality of life are common outcomes [2, 3]. Positive aspects of caregiving have also been identified among informal caregivers, such as a sense of personal accomplishment and enhanced family cohesion [4]. However, the exploration of positive psychological well-being has received relatively less attention, particularly in the context of formal caregivers providing long-term care to individuals with dementia, whose well-being status has been largely overlooked [5].

Both formal and informal caregivers are crucial resources in long-term dementia care, sharing a commitment to providing care and support for people with dementia. This shared commitment may result in similar characteristics in caregiving experiences, leading to similarities in caregiving appraisals and well-being outcomes [6]. At the same time, the distinct relationships with care recipients may also give rise to variations in caregivers' experiences, leading to different health outcomes [7]. However, no definitive conclusion has yet been drawn regarding their subjective well-being outcomes and the similarities and differences in these outcomes.

Psychological well-being and self-rated health are two subjective well-being outcomes for caregivers. Psychological well-being refers to positive psychological functioning encompassing six key dimensions: self-acceptance, positive relations with others, autonomy, environmental mastery, purpose in life, and personal growth [8]. To take a broader view, rather than only focusing on psychological aspect. Self-rated health represents an individual's subjective assessment and evaluation of his/her own health status, including biological, psychological and social dimensions, and it serves as an independent predictor for mortality [9–11]. Empirical studies have revealed that impaired subjective well-being is significantly associated with depression and life stress, thereby increasing the susceptibility to adverse health outcomes [12, 13]. However, there is a dearth of research comparing the psychological well-being and self-rated health status of formal and informal caregivers, along with their respective influencing factors. Understanding these aspects is crucial for identifying common and unique challenges faced by caregivers and developing tailored interventions. Therefore, it is imperative to investigate the subjective well-being status of both formal and informal caregivers of individuals with dementia, while also exploring the underlying influencing factors.

According to Lawton's two-factor model, caregiving appraisal is an essential determinant of caregiver well-being [14]. Caregiving appraisal encompasses all cognitive and affective evaluations of the potential stressor and one's coping efforts' efficacy, which can be positive, neutral, or negative while coexisting as forms of caregiving mastery, satisfaction, ideology, burden, and impact [14]. Previous research has demonstrated that caregiving appraisal significantly impacts the overall well-being of both caregivers and care recipients [15], particularly influencing positive psychological well-being status for caregivers [16]. Positive caregiving appraisal may facilitate the development of coping skills, thereby mitigating burnout risks and enhancing communication with care recipients, ultimately leading to improved quality of care provision [17]. However, limited research has explored the influence of caregiving appraisal on coping and the subjective well-being of formal and informal caregivers of people with dementia, particularly whether the influence differs between groups. This limitation hinders the possibility of adopting health promotion strategies from one group to another. To address these gaps, a cross-sectional study was designed to investigate the differences between the two groups of caregivers on psychological well-being and self-rated health and variations of their influencing factor.

Methods

Aims

1. To compare the psychological well-being and self-rated health between formal and informal caregivers of people with dementia.
2. To investigate the factors influencing the psychological well-being and self-rated health among formal and informal caregivers.

Study design

A questionnaire-based cross-sectional study with a sample of formal and informal caregivers of people with dementia.

Setting

Informal caregivers were recruited from outpatient departments of four tertiary hospitals in Zhengzhou City, China, which receive patients from both within and beyond Henan province. Formal caregivers were recruited from the geriatric inpatient departments of these hospitals, which provide integrated medical and elderly-care services for people with dementia.

Participants and sample size

Convenience sampling was used to recruit participants. The inclusion criteria included having provided care for a person with dementia for a duration exceeding six months; dedicating at least four hours per day to caregiving responsibilities; being 18 years of age or older; lacking any diagnosed psychiatric comorbidity; assisting with at least one activity of daily living (bathing, dressing, toileting, transferring, continence or feeding) for the care recipient. The exclusion criteria encompassed caregivers with health conditions that could impact their ability to provide accurate responses to the survey questions, such as cognitive impairment or severe mental health issues.

The sample size calculation was performed using G-Power software (for both the two-independent-sample t-test and regression analysis employed in this study). For the independent t-tests, a power of 0.95 and $\alpha=0.05$ were assumed to detect a medium difference ($d=0.5$) in psychological well-being between the two groups, requiring a total of 210 participants (105 per group). In terms of regression analysis, we considered a power of 0.95 and $\alpha=0.05$ to detect a medium effect size ($f^2=0.15$) across 15 tested predictors, resulting in a minimum required sample size of 398 participants (199 per group). Taking into account both approaches, we determined that a larger sample size of 398 would be appropriate. Considering an anticipated invalid response rate of 10% [16], at least 438 eligible participants should be recruited (219 per group).

Measurements

Dependent variable

Psychological well-being The Chinese version of Ryff's Psychological Well-being Scale [18] was employed in this study. This scale consists of 18 items rated on a Likert 6-point scale, and encompasses six subscales: autonomy, positive relations with others, personal growth, environmental mastery, self-acceptance, and purpose in life. The coding of each item ranged from totally disagree (1) to totally agree (5). Higher scores on the scale indicate a more favorable psychological well-being status. In this study, the overall internal consistency reliability of the scale was excellent (Cronbach's $\alpha=0.918$), while the Cronbach's α coefficients for the subscales ranged from 0.704 to 0.879.

Self-rated health was measured using a summative item from a validated scale [19], with participants responding to the item "How would you generally characterize your overall health condition?". This item employed a rating scale ranging from 1 (excellent) to 5 (poor), where higher scores indicated poorer health.

Independent variable

Caregiving appraisal

The study utilized the Caregiving Appraisal Scale developed by Wang [20], which is a 26-item Likert 5-point scale ranging from strongly disagree (1) to strongly agreee (5). The Chinese version of the scale encompasses two constructs and four subscales, namely positive caregiving appraisal (including caregiving mastery and caregiving satisfaction) and negative appraisal (caregiving burden and caregiving impact). To ensure higher scores indicate more positive caregiving appraisal, recoding was performed (convert the score to its opposite) for the scores of caregiving burden and caregiving impact when calculating the total score. The overall internal consistency of the scale was satisfactory with Cronbach's $\alpha=0.836$, while Cronbach's α for the subscales ranged from 0.692 to 0.859 in this study.

Coping

The Chinese version of the Ways of Coping Questionnaire [21] was used to assess coping strategies. This questionnaire comprised two subscales - active coping and passive coping - with a total of 20 items. It is a 4-point Likert scale ranging from never (0) to often (3). Notably, the scores for passive coping were reversed when calculating the total scores so that higher total scores indicated more active coping strategies. In this study, the Cronbach's α coefficients was 0.895 for overall scale, 0.878 for active coping subscale, and 0.789 for passive coping subscale.

Demographics

A demographic questionnaire with essential covariates was designed by our team, with reference to the findings of our previous systematic review [22]. The information included caregiver age, gender, education level, caregiving duration, intensity, care recipient age, type of dementia, stage of dementia, etc.

Data collection process

The data were collected between January 2022 and March 2023 by a trained research assistant and a research nurse, under the supervision of the research team. All participants received comprehensive information regarding the study's objectives and procedures, and informed consent was obtained from each individual. The questionnaires were finished either through face-to-face interviews or self-administered online questionnaires.

Statistical methods

The data analysis was conducted using R software version 4.0.5. Proportions of missing values were analyzed using descriptive statistics. Little's missing completely at random test (MCAR) was used to examine the pattern of missing values, and it turned out to be missing completely at random. Given that the proportion was below 5%, missing values were imputed using series means, as recommended by Hair Jr et al. [23]. Descriptive statistics were employed to examine the demographics and outcome variables. T-test and Chi-Square tests were used to compare the differences in caregiver characteristics and outcome variables. Multivariate stepwise regression was utilized to investigate the predictors of psychological well-being and self-rated health of the two caregiver groups. The stepwise regression was done by backward elimination. The order of entry is automatically chosen by the regression model; each backward step potentially eliminated the predictor with the largest p-value in the sequential F-test. The residuals of the models were checked for normality, and diagnostic plots were examined. There were no severe deviations from normality or lack of fit. Confounders, including the age and gender of caregivers and care recipients, caregiver education, caregiving intensity, caregiver duration, and type and stage of dementia, are included in the regression models.

Ethical considerations

Ethical approval was obtained from the university of the corresponding author, ensuring compliance with institutional guidelines. The investigation was conducted anonymously to protect participant confidentiality, and all collected information was securely maintained in accordance with ethical standards. Access to the data was restricted solely to the research team. Informed consent was diligently obtained from all participants involved in this study.

Results

Participants

Five hundred and two caregivers, including 254 informal caregivers and 248 formal caregivers, were approached for recruitment after initial screening conducted by clinical nurses. Among them, 232 informal caregivers and 236 formal caregivers consented to participate in this study. Among all the finished questionnaires, 229 were valid for informal caregivers, and 211 were valid for formal caregivers. The average age of informal caregivers ($M = 57.61$, $SD = 14.428$) was significantly higher compared to formal caregivers ($M = 55.32$, $SD = 5.212$) ($t = 2.215$, $P = 0.014$). 33.62% of the informal caregivers were working caregivers, 21.40% were jobless, and 44.98% were retired. A majority of the caregivers were female, and the proportion of females among formal caregivers was higher than that among informal caregivers ($\chi^2 = 11.681$, $P < 0.001$). Informal caregivers had a longer duration of caregiving on average ($M = 4.02$, $SD = 4.369$) in terms of years compared to formal caregivers ($M = 2.82$, $SD = 3.106$) ($t = 3.285$, $P = 0.001$), while formal caregivers spend more time with the care recipients per day (i.e., caregiving intensity) ($t = -14.128$, $P < 0.001$). There were no differences observed in the type or gender of dementia for care recipients; however, care recipients cared for by formal caregivers were of higher age ($t = -7.791$, $P < 0.001$) and had more severe stages of dementia compared to those taken care of by informal caregivers ($\chi^2 = 50.820$, $P < 0.001$) (Table 1).

Statistically significant differences were observed between formal and informal caregivers in terms of caregiving appraisal. Formal caregivers exhibited more positive caregiving appraisals ($t = -2.123$, $P = 0.034$), specifically in relation to caregiving mastery ($t = -6.833$, $P < 0.001$) and caregiving satisfaction ($t = -6.841$, $P < 0.001$). However, no significant difference was found in negative caregiving appraisals regarding caregiving burden and impact. Moreover, there were no statistically significant differences in coping strategies employed by the two groups of caregivers. In terms of psychological well-being, formal caregivers demonstrated significantly higher levels ($t = -3.818$, $P < 0.001$) across various subscales ($t = -5.108$ - -1.996, $P < 0.05$), as well as better self-rated health compared to informal caregivers ($t = 9.037$, $P < 0.001$) (Table 2). Bivariate correlations between the variables are presented in Supplementary Tables 1 and Supplementary Table 2.

Predictors of psychological well-being

Informal and formal caregivers had different predictors for their psychological well-being, which may have contributed to the differences in psychological well-being between groups. For informal caregivers, their psychological well-being was mainly influenced by coping (standardized $\beta = 0.309$) and caregiving mastery (standardized $\beta = 0.270$), followed by caregiver education level (standardized $\beta = 0.180$) and caregiving intensity

Table 1 Demographic characteristics of the study sample

Demographic characteristics	**Informal caregivers ($n = 229$)**	**Formal caregivers ($n = 211$)**		
	M (SD)/ Number (%)	**M (SD)/ Number (%)**	**t /χ^2(df)**	***p***
Caregiver age	57.61 (14.428)	55.32 (5.212)	2.215	**0.014**
Caregiver gender			11.681 (1)	**< 0.001**
Female	145 (63.3%)	165 (78.2%)		
Male	84 (36.7%)	46 (21.8%)		
Caregiver education level			176.06 (2)	**< 0.001**
Primary school or below	17 (7.4%)	83 (39.3%)		
Middle school	78 (34.1%)	124 (58.8%)		
Associate degree or above	134 (58.5%)	4 (1.9%)		
Caregiving duration (year)	4.02 (4.369)	2.82 (3.106)	3.285	**0.001**
Time spent with the care recipient (hr/day)	15.09 (8.817)	23.65 (2.056)	−14.128	**< 0.001**
Care recipient age	76.824 (13.76)	85.819 (10.237)	−7.791	**< 0.001**
Type of dementia			0.319 (2)	0.853
Alzheimer's disease	97 (42.4%)	95 (45%)		
Vascular dementia	93 (40.6%)	82 (38.9%)		
Other types	39 (17.0%)	34 (16.1%)		
Care recipient's gender			0.144 (1)	0.774
Female	123 (53.7%)	109 (51.9%)		
Male	106 (46.3%)	101 (48.1%)		
Care recipient's stage of dementia			50.820 (3)	**< 0.001**
Mild	94 (41%)	73 (34.6%)		
Moderate stage	67 (29.3%)	26 (12.3%)		
Moderately severe	49 (21.4%)	41 (19.4%)		
Severe	19 (8.3%)	71 (33.6%)		

Table 2 Comparisons of the outcome variables of formal and informal caregivers

Variable	**Informal caregivers ($n = 229$)**		**Formal caregivers ($n = 211$)**			
	M	**SD**	**M**	**SD**	**t**	***P***
Caregiving appraisal	86.37	13.12	89.22	14.22	−2.123	**0.034**
Caregiving burden	36.57	8.04	36.57	9.66	0.006	0.995
Caregiving impact	13.43	3.65	13.77	3.93	−0.941	0.347
Caregiving mastery	14.95	2.39	16.49	2.26	−6.833	**< 0.001**
Caregiving satisfaction	19.17	2.51	20.97	2.72	−6.841	**< 0.001**
Coping	35.52	6.60	35.87	7.16	−0.478	0.633
Active coping	24.95	8.82	23.79	8.35	1.400	0.162
Passive coping	12.37	5.61	11.77	5.31	1.143	0.254
Psychological well-being	80.03	14.34	85.30	13.09	−3.818	**< 0.001**
Positive relations with others	13.73	3.02	14.02	2.80	−1.042	0.298
Autonomy	12.44	3.01	13.52	3.21	−3.567	**< 0.001**
Environmental mastery	14.31	3.03	15.33	2.45	−3.818	**< 0.001**
Personal growth	13.34	3.07	14.32	2.90	−3.375	**0.001**
Purpose in life	12.63	3.25	13.30	3.65	−1.996	**0.047**
Self-acceptance	13.46	2.99	14.81	2.46	−5.108	**< 0.001**
Self-rated health	3.18	0.89	2.34	1.03	9.037	**< 0.001**

(standardized $\beta=0.166$). Similarly, caregiving mastery (standardized $\beta=0.194$–0.284) was a significant predictor for positive relations with others, autonomy, environmental mastery, and self-acceptances. Meanwhile, coping (standardized $\beta=0.169$–0.286) was a significant predictor for all the subscales of psychological well-being. In addition, caregiving impact was a significant predictor for environmental mastery (standardized $\beta=-0.212$), and self-acceptance (standardized $\beta=-0.139$) (Table 3).

For formal caregivers, caregiving satisfaction was a significant predictor for their psychological well-being and all the subscales except purpose in life (standardized $\beta=0.159$–0.267). Caregiving intensity significantly influenced psychological well-being and all the subscales (standardized $\beta=0.136$–0.242). Coping significantly influenced the psychological well-being total score and positive relations with others, personal growth, and purpose in life (standardized $\beta=0.170$–0.212); while passive coping significantly influenced the total score of psychological well-being, autonomy, personal growth, purpose in life, and self-acceptance (standardized $\beta=0.150$–0.188). Caregiving mastery (standardized $\beta=0.193$) significantly influenced environmental mastery, and caregiving burden significantly influenced positive relations with others (standardized $\beta=-0.239$) (Table 4).

Predictors of self-rated health

For informal caregivers of people with dementia, the self-rated health was mainly influenced by passive coping strategies (standardized $\beta=0.354$) and caregiving

Table 3 Predictors of psychological well-being for informal caregivers

DV	IV	β	SE	Standardized β	t	*p*-value	Semi-partial corr	Adj R^2 [F]
PWB	Coping	0.698	0.184	0.309	3.796	< 0.001	0.266	0.273
	Caregiving mastery	1.811	0.590	0.270	3.071	0.003	0.215	[6.056]
	Caregiver education	2.703	1.401	0.180	1.929	0.056	0.135	
	Caregiving intensity	0.261	0.148	0.166	1.760	0.081	0.119	
PWB_PR	Coping	0.132	0.039	0.286	3.380	0.001	0.248	0.201
	Caregiving mastery	0.375	0.127	0.271	2.945	0.004	0.216	[4.383]
	Caregiver gender	0.895	0.532	0.139	1.681	0.095	0.123	
PWB_AU	Caregiving mastery	0.332	0.132	0.234	2.515	0.013	0.189	0.163
	Caregiver education	0.710	0.314	0.224	2.260	0.025	0.170	[3.876]
	Caregiver gender	−1.240	0.556	−0.187	−2.230	0.027	−0.168	
	Coping	0.081	0.043	0.169	1.892	0.061	0.142	
	Caregiver age	0.040	0.022	0.183	1.832	0.069	0.138	
	Caregiving intensity	−0.096	0.055	−0.145	−1.765	0.080	−0.133	
	Caregiver burden	0.053	0.031	0.140	1.693	0.093	0.127	
PWB_EM	Caregiving impact	−0.187	0.068	−0.212	−2.752	0.007	−0.188	0.302
	Coping	0.092	0.039	0.197	2.369	0.019	0.162	[5.966]
	Passive coping	−0.116	0.053	−0.166	−2.167	0.032	−0.148	
	Caregiving mastery	0.272	0.127	0.194	2.137	0.034	0.146	
PWB_PG	Coping	0.131	0.041	0.274	3.216	0.002	0.230	0.237
	Caregiving satisfaction	0.286	0.107	0.223	2.660	0.009	0.190	[5.203]
	Caregiver education	0.779	0.306	0.242	2.542	0.012	0.182	
	Care recipient gender	−0.929	0.534	−0.145	−1.737	0.085	−0.124	
PWB_PL	Caregiver education	0.792	0.335	0.240	2.366	0.019	0.180	0.147
	Coping	0.105	0.044	0.214	2.364	0.019	0.180	[3.244]
	Caregiving intensity	0.068	0.038	0.180	1.791	0.075	0.136	
	Caregiving satisfaction	0.210	0.117	0.159	1.785	0.076	0.136	
PWB_SA	Caregiving mastery	0.393	0.135	0.284	2.909	0.004	0.215	0.199
	Coping	0.094	0.040	0.203	2.369	0.019	0.175	[3.899]
	Caregiving impact	−0.121	0.073	−0.139	−1.669	0.097	−0.123	

Note: [1] *PWB* psychological well-being, *PR* positive relations with others, *AU* autonomy, *EM* environmental mastery, *PG* personal growth, *PL* purpose in life, *SA* self-acceptance. [2] All models have p-value < 0.001. [3] Caregiving intensity is measured as time spent with the care recipient (hr/day). [4] Backward elimination is performed on caregiving appraisals, coping and their subscales only. [5] Controlled confounders are always included as predictors in the models. Confounders include age and gender of caregiver and care recipients, caregiver education, caregiving intensity, caregiver duration, type and stage of dementia. [6] For each outcome, only predictors with *p*-value < 0.10 are shown

Table 4 Predictors of psychological well-being for formal caregivers

DV	IV	β	SE	Standardized β	t	*p*-value	Semi-partial corr	Adj R^2 [F]
PWB	Caregiver satisfaction	1.285	0.331	0.267	3.879	0.000	0.256	0.200
	Caregiving intensity	1.479	0.481	0.242	3.074	0.002	0.203	[4.838]
	Passive coping	0.479	0.176	0.188	2.718	0.007	0.179	
	Caregiver gender	6.407	2.468	0.204	2.596	0.010	0.171	
	Coping	0.301	0.122	0.170	2.462	0.015	0.162	
	Caregiver education	2.558	1.406	0.127	1.820	0.071	0.120	
PWB_PR	Caregiver satisfaction	0.254	0.075	0.238	3.403	0.001	0.230	0.160
	Caregiver impact	0.226	0.068	0.316	3.335	0.001	0.226	[3.623]
	Coping	0.083	0.028	0.212	2.991	0.003	0.203	
	Caregiving intensity	0.269	0.109	0.198	2.456	0.015	0.166	
	Caregiving burden	−0.069	0.028	−0.239	−2.453	0.015	−0.166	
	Caregiver gender	1.043	0.568	0.150	1.838	0.068	0.124	
PWB_AU	Type of dementia	1.052	0.326	0.232	3.233	0.001	0.221	0.140
	Caregiver satisfaction	0.261	0.085	0.217	3.048	0.003	0.209	[3.693]
	Passive coping	0.106	0.045	0.167	2.363	0.019	0.162	
	Caregiving intensity	0.237	0.124	0.156	1.915	0.057	0.131	
PWB_EM	Stage of dementia	0.329	0.129	0.180	2.546	0.012	0.174	0.141
	Caregiver gender	−0.893	0.358	−0.194	−2.496	0.014	−0.171	[3.701]
	Caregiving mastery	0.204	0.089	0.193	2.293	0.023	0.157	
	Caregiving intensity	0.198	0.090	0.178	2.197	0.029	0.150	
	Caregiver satisfaction	0.139	0.073	0.159	1.907	0.058	0.131	
PWB_PG	Caregiver eduction	0.990	0.317	0.223	3.121	0.002	0.210	0.167
	Caregiving satisfaction	0.212	0.075	0.200	2.841	0.005	0.191	[4.030]
	Coping	0.076	0.028	0.195	2.748	0.007	0.185	
	Caregiver gender	1.463	0.557	0.212	2.629	0.009	0.177	
	Passive coping	0.096	0.040	0.171	2.415	0.017	0.163	
	Caregiver intensity	0.183	0.109	0.136	1.684	0.094	0.113	
PWB_PL	Coping	0.106	0.038	0.208	2.766	0.006	0.198	0.060
	Caregiving intensity	0.344	0.151	0.195	2.283	0.024	0.164	[1.998]
	Passive coping	0.110	0.055	0.150	2.023	0.045	0.145	
PWB_SA	Caregiver gender	1.806	0.456	0.312	3.960	0.000	0.263	0.191
	Caregiver satisfaction	0.231	0.061	0.260	3.761	0.000	0.249	[4.947]
	Passive coping	0.081	0.032	0.173	2.520	0.013	0.167	
	Caregiving intensity	0.222	0.089	0.197	2.499	0.013	0.166	

Note: [1] *PWB* psychological well-being, *PR* positive relations with others, *AU* autonomy, *EM* environmental mastery, *PG* personal growth, *PL* purpose in life, *SA* self-acceptance. [2] All models have *p*-value < 0.001, except model for PWB_PL, the p-value is 0.032. [3] Caregiving intensity is measured as time spent with the care recipient (hr/day). [4] Backward elimination is performed on caregiving appraisals, coping and their subscales only. [5] Controlled confounders are always included as predictors in the models. Confounders include age and gender of caregiver and care recipients, caregiver education, caregiving intensity, caregiver duration, type and stage of dementia. [6] For each outcome, only predictors with *p*-value < 0.10 are shown

impact (standardized $\beta = 0.228$), which indicated that people with passive coping strategies and negative appraisal was associated with worse self-rated health. Care recipient gender (standardized $\beta = 0.189$), and caregiving intensity (standardized $\beta = 0.176$) also significantly influenced their self-rated health.

For formal caregivers, passive coping was also a significant predictor (standardized $\beta = 0.156$), followed by caregiving appraisal total score (standardized $\beta = -0.168$) and caregiving mastery (standardized $\beta = -0.151$) (Table 5).

Discussion

To the best of our knowledge, this study represents the first systematic examination of the impact of caregiving appraisal, coping strategies, and psychological well-being on both formal and informal caregivers. Our findings indicate that coping plays a significant role in influencing the psychological well-being of both groups. However, differences were observed in the influence of caregiving appraisal between these two caregiver populations.

Table 5 Predictors of self-rated health

DV	IV	β	SE	Standardized β	t	*p*-value	Semi-partial corr	Adj R^2 [F]
Informal caregivers								
Self-rated health	Passive coping	0.068	0.015	0.354	4.427	0.000	0.334	0.156
	Caregiving impact	0.056	0.019	0.228	2.876	0.005	0.217	[3.489]
	Care recipient gender	0.327	0.153	0.189	2.147	0.034	0.162	
	Caregiving intensity	0.032	0.015	0.176	2.138	0.034	0.161	
Formal caregivers								
Self-rated health	Passive coping	0.032	0.015	0.156	2.124	0.035	0.152	0.067
	Caregiving appraisal	−0.012	0.006	−0.168	−1.972	0.050	−0.141	[2.620]
	Caregiving mastery	−0.072	0.042	−0.151	−1.716	0.088	−0.123	

Distinct from previous research which extensively studied the influence of caregiving burden on caregiver well-being [24], this study contributes novel insights in this domain by identifying that coping and caregiving masteryconsistently exert a more significant influence on the psychological well-being of informal caregivers compared to caregiver burden or caregiving intensity. These findings suggest that it is not solely the challenges themselves but rather the ability to effectively navigate them that primarily affects caregivers' psychological well-being. Consequently, training programs focusing on enhancing coping skills and mastery are imperative for caregivers to sustain their psychological well-being throughout their long-term caregiving journey [17, 25]. Furthermore, it is imperative to strike a balance between caregiving responsibilities and the need for recuperation in order to uphold caregivers' psychological well-being. Engaging in leisure activities can serve as a viable alternative for caregivers [26].

For formal caregivers, caregiving satisfaction, caregiving intensity, and coping strategies are found to have a significant influence on their psychological well-being. This could be attributed to the fact that caregiving satisfaction for formal caregivers is closely related to job satisfaction. Providing a supportive work environment and empowering them with a sense of fulfillment and accomplishment in their work may foster positive emotional experiences for them [27]. Similarly, coping strategies also play a crucial role as predictors for formal caregivers. However, it is noteworthy that the passive coping subscale exhibits positive associations with various subscales of formal caregivers' psychological well-being. This may be due to certain items within the passive coping subscale, such as self-comforting, which can be considered as a coping mechanism serving as a protective measure against potential harm [28].

In contrast to the factors influencing informal caregivers, caregiving intensity significantly influences all aspects of formal caregivers' psychological well-being with varying degrees of influence. This disparity may be attributed to the considerably higher caregiving intensity experienced by formal caregivers in this study. However, it is noteworthy that even with a more intense caregiving workload, formal caregivers exhibited better psychological well-being compared to their informal counterparts. This could potentially be attributed to the hidden effect of family ties, as witnessing the decline of a family member due to dementia can lead to emotional distress, loss, and grief among caregivers [29]. The strong familial bond can amplify these emotional impacts and subsequently decrease their psychological well-being status [29]. Another novel finding compared to previous research is that formal caregivers with more demanding caregiving duties demonstrated a more positive psychological well-being status. One possible explanation for this unexpected positive association is derived from the sense of purpose and fulfillment that formal caregivers derive from providing intensive care to individuals with dementia. This notion is supported by statistically significant higher levels observed in subscales such as autonomy, environmental mastery, personal growth among formal caregivers, as well as the significant correlation between caregiving satisfaction and psychological well-being. Furthermore, it is plausible that formal caregivers who willingly undertake higher caregiving intensities possess certain personal characteristics or needs, such as increased remuneration. Further research should aim at conducting more comprehensive investigations into these underlying reasons.

For the self-rated health of informal caregivers, passive coping and negative caregiving appraisal (caregiving impact) emerged as significant influencing factors as manifested by their semi-partial correlation greater than 0.2, followed by caregiving intensity. This finding may be attributed to the tendency of individuals with passive coping strategies to adopt a passive and avoidant approach when dealing with stressors and challenges related to their caregiving responsibilities, resulting in reduced engagement in self-care [30]. Additionally, negative appraisals impose cognitive and emotional strain on caregivers, leading to prolonged exposure to chronic stress that can have detrimental effects on their physiological functioning, immune system, and overall health [31]. Furthermore, negative caregiving appraisal may contribute to decreased perceived social support and increased social isolation, further exacerbating the decline in self-rated health [16]. Therefore, interventions aimed at enhancing negative caregiving appraisals and passive coping strategies should be developed to improve the self-rated health of informal caregivers. Self-help interventions, such as bibliotherapy, which have demonstrated efficacy in enhancing negative appraisals and coping strategies, can be conducted to ascertain their potential for ameliorating the self-rated health of informal caregivers [28, 32].

The influence of caregiving intensity and care recipient gender on informal caregivers' self-rated health may be attributed to the increased responsibilities and demands associated with high-intense care. This, combined with the physical and emotional toll of caregiving, can have a detrimental effect on caregivers' self-rated health [33]. Moreover, providing care for female recipients, particularly in the context of dementia care, presents specific challenges and stressors due to their complex needs that are often difficult to manage [34]. Additionally, women are culturally expected to assume caregiving roles and have predominantly taken on primary caregiver responsibilities across various caregiving tasks [35]. Hence, when a woman has dementia, it may result in a loss of available caregiving workforce to the family as well, which adds an additional hidden burden for the family and consequently worsens their self-rated health.

The influence of passive coping on the self-rated health of formal caregivers is comparable to that of informal caregivers. However, there are differences in the influence of caregiving appraisal and caregiving mastery between these two groups. This discrepancy may be because formal caregivers operate within specific job responsibilities and established care structures. The performances in these structures influence their evaluation of caregiving experiences and perceived sense of competence, which in turn can significantly influence their effect and self-rated health [36]. Understanding these distinctions is crucial for tailoring interventions to address the distinct needs and challenges faced by both formal and informal caregivers in maintaining their well-being.

Limitations

Despite yielding some significant findings, this study still has some limitations that cannot be ignored when interpreting the results. The implementation of random sampling was rendered impossible due to social distancing measures imposed during the pandemic, potentially introducing sampling bias and limiting the representativeness of the target populations. Although the hospitals selected to cater to patients from both within and beyond the province, the restriction on selecting hospitals from a single city may still introduce some selection bias. Future research is recommended to employ more representative samples in order to draw conclusive findings. Furthermore, given that all questionnaires were self-administered, despite the research team's emphasis on anonymity and the absence of right or wrong answers, it is inevitable to encounter socially desirable responses.

Conclusion

This study presents one of the first comparisons examining the psychological well-being and self-rated health between informal and formal caregivers of people with dementia. In general, formal caregivers exhibited better psychological well-being and self-rated health in comparison to informal caregivers, despite dedicating more time to caregiving for people with dementia. The study highlights distinct factors influencing the psychological well-being of informal and formal caregivers, offering valuable insights for developing targeted interventions. For informal caregivers, enhancing their sense of caregiving mastery through caregiving skill-building training and coping strategy programs could significantly improve their well-being. Meanwhile, formal caregivers may benefit from interventions aimed at increasing caregiving satisfaction, such as creating supportive work environment and implementing recognition systems. By directly linking these factors to practical intervention strategies, we may better support caregivers' psychological well-being and improve the quality of care they provide.

Abbreviations

M	Mean
SD	Standard Deviation
DV	Dependent Variable
IV	Independent Varaible
df	Degree of Freedom
SE	Standard Error
PWB	Psychological Well-Being
PR	Positive Relations with others
AU	Autonomy
EM	Environmental Mastery
PG	Personal Growth
PL	Purpose in Life
SA	Self-Acceptance

Supplementary Information

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Additional file 1.

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Authors' contributions
All authors have contributed sufficiently to the manuscript to be included as authors. SSW: Conceptualization, Investigation, Writing – original draft. YQL: Writing – original draft. QJS: Conceptualization, Data curation. MHL: Writing – original draft. PW: Data curation. CHH: Data curation. SZL: Data curation. All authors read and approved the final manuscript.

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Data availability
The datasets used and/or analysed during the current study available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate
Ethical approval was obtained from Zhengzhou University. Informed consent was diligently obtained from all participants involved in this study.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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