

Relationship Between Multiple Roles and Leisure-Time Physical Activities in Working-Age Women

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ABSTRACT

Background: Multiple role theory has proven effective in predicting variations in health, and a growing body of research has shown the importance of taking women's roles into account when analyzing physical activity levels. Nonetheless, researchers have yet to characterize the interaction between the various roles played by women and their physical activity.

Purpose: The objectives of this study were to elucidate the relationship between multiple roles and leisure-time physical activities (LTPAs) and to determine whether LTPA varies among women across different roles.

Methods: Data were derived from the 2013 National Health Interview Survey database provided by the Health Promotion Administration of Taiwan's Ministry of Health and Welfare, which includes 5,147 working-age women. The current study focused on women aged 20–50 years. The roles considered in this study included living with a partner, living with children, and employment status. LTPA levels were categorized as regular, inactive, or insufficient based on the LTPA metabolic equivalent in the previous week. The associations among level of LTPA, multiple roles, and demographic characteristics were analyzed using multiple regression analysis.

Results: We found single mothers with children to be more inactive than partnered mothers, and women living with a partner and those living with children were more likely to be inactive, whereas women working full-time were not at risk of inactivity. Women who assumed a larger number of roles were at a greater risk of inactivity. These findings are consistent with role strain theory.

Conclusions: Single mothers with children are more inactive than partnered mothers, and appropriate social support programs are necessary to reduce further disparities. Second, multiple demands on working-age women limit the time available for LTPAs, particularly among women living with a partner and children and engaged in full-time work. A physical activity intervention is a program or initiative designed to promote physical activity and improve health outcomes. We should develop and provide sustainable physical activity resources through the help of partners' housework to better promote physical activity intervention for working-age women.

KEY WORDS:

multiple roles, role strain, role attachment, leisure-time physical activities, working-age women, physical activity intervention.

Introduction

Inactivity is a major issue in developed countries. Research has consistently shown that physical activity has a protective effect against chronic medical conditions (e.g., hypertension, heart disease, Type 2 diabetes, colon cancer, breast cancer, and osteoporosis) and premature mortality (World Health Organization [WHO], 2018). Nonetheless, approximately 23% of adults aged 18 years and over fail to attain the recommended level of physical activity (WHO, 2018), with women being less physically active than men of the same age in most countries (Edwards & Sackett, 2016; Hallal et al., 2012). The low prevalence of physical activity among women is a health issue that needs to be addressed. In Western countries, physical activity among women has been shown to decrease with age. In East Asian (including Taiwan), women aged 20–50 years have the lowest average physical activity (Bauman et al., 2012; Chao et al., 2011). In Taiwan, the prevalence of normal physical activity in the 25- to 49-years age group is relatively low (Chao et al., 2022; Sports Administration, Ministry of Education, Taiwan, ROC, 2021). The low physical activity level among working-age women has attracted considerable interest among researchers (Health Promotion Administration, Ministry of Health and Welfare, Taiwan, ROC, 2018). This is also an issue that governments must address, largely because of the increased participation of women with dependent children in the labor force.

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How physical activity is affected by factors at the individual, environmental, and policy levels has been investigated over the past three decades (Bauman et al., 2012). However, level of physical activity has consistently been found to be lower among women than men (Belcher et al., 2010). Men's health status is generally explained by socioeconomic status, whereas women's health is more affected by social roles (Lahelma et al., 2002), perhaps because women often fulfill multiple roles. A number of studies have investigated the effects on women of employment status and of living with a partner and/or children (Fernández Lorca & Lay, 2020; Kuehner, 2017). However, there is a need to expand the scope of the analysis beyond single roles (Bauman et al., 2012; Prince et al., 2014), as few researchers have considered the integrated effects of multiple roles.

Two main theories, namely, role strain theory and role attachment theory, have been used to describe the impact of multiple roles on women (Fekete et al., 2019; Meighan, 2017; Shrestha et al., 2019). Role strain theory focuses on the role conflict model, which describes competing demands and obligations of multiple roles that may result in role conflict, role overload, or role contagion (Berger & Bruch, 2021). This theory posits that juggling employment and family responsibilities consumes significant time resources, demands focus and energy, and adversely affects personal well-being (Shrestha et al., 2019). The constraints on personal time involve life transitions that increase one's responsibilities and obligations such as starting or leaving a job, acquiring a mortgage, getting married, and having children (Joseph et al., 2015). Role strain theory posits that having a full-time job with dependent children is likely to lead to role strain with potentially negative effects on an individual's health (Shrestha et al., 2019).

Attachment theory takes the opposite position of role strain theory, positing that a paid job and responsibilities toward children and/or a partner are sources of social support that increase self-esteem (Fitton, 2013) and that paid employment provides income and financial independence. Improved self-esteem and greater financial independence can promote health by buffering against adverse health effects through the provision of social support (Fekete et al., 2019; Lahelma et al., 2002). Many studies have explored gender-specific differences in the relationship between multiple roles and health (Brim et al., 2019; Ju et al., 2018; O'Connor et al., 2021). Overall, the findings suggest that the multiple roles assumed by women impact their overall health significantly (Kuehner, 2017; Lahelma et al., 2002). However, the relationship between multiple roles and level of physical activity in the context of these two contending hypotheses remains uncertain.

Leisure-time physical activity (LTPA) is used to broadly describe the physical activity that an individual engages in during their free time (i.e., time not dedicated to work or commuting; Chao et al., 2011). LTPA is a public health issue with implications beyond physical activity (Lee et al., 2020). Numerous researchers have examined the impact of LTPA on health and have found evidence in support of psychosocial and spiritual benefits (Lin et al., 2010; Prince et al., 2021).

Physical activity during leisure time has also been shown to slow or prevent age-related disability (Chen, Chiang, et al., 2016). LTPA is an important issue in the context of public health policy and health programs for older adults (Chen, Chen, et al., 2016; Chen et al., 2018). Nonetheless, researchers have yet to fully elucidate the underlying reasons why women lag behind men in terms of LTPA.

A growing body of research has shown the importance of single roles in analyzing physical activity levels (Chao et al., 2011; Hsu et al., 2019; Su et al., 2013). Employment status is a major factor contributing to poor health, particularly in employees engaged in low-activity occupations (Cook & Gazmararian, 2018; Quinn et al., 2020). Long working hours allow less time for LTPA (Cook & Gazmararian, 2018). Nonetheless, research on the association between marital status and physical activity has yielded mixed findings (Chao et al., 2011; Hilz & Wagner, 2018; Hull et al., 2010; Schoeppe et al., 2018). Taking on a parenting role has been shown across all races to reduce the opportunity to engage in dedicated physical activities (Edwards & Sackett, 2016; Eyer et al., 2002). Nonetheless, most research on women's single roles and LTPA has focused on the individual rather than multiple roles (Fernández Lorca & Lay, 2020; Kuehner, 2017; Lahelma et al., 2002). Therefore, the purpose of our research was to explore this issue.

Inactive lifestyle is often associated with lack of free time because of life transitions that increase personal responsibilities and obligations (Cook & Gazmararian, 2018; Joseph et al., 2015). Multiple roles refer to the responsibilities of employment and those related to the family (Lahelma et al., 2002). Multiple role theory has proven effective in several studies as a predictor of variations in health (Kuehner, 2017; Lahelma et al., 2002). However, the directions of the associations discovered have been inconsistent. The findings of several studies have found caregiving to be negatively associated with life satisfaction (Fernández Lorca & Lay, 2020), whereas other studies have found the health of women in two-parent families with children to be superior to that of women in other types of families (Kuehner, 2017; Lahelma et al., 2002). Despite extensive research on the relationship between multiple roles and female health (Brim et al., 2019; Fernández Lorca & Lay, 2020), relatively little investigation work has been done on the relationship between multiple roles and level of physical activity. The objectives of this study were to elucidate the relationship between multiple roles and LTPA from the perspective of multiple role theory and to determine whether LTPA is significantly related to the roles that women assume.

Methods

Data

This study used data from the 2013 Taiwan National Health Interview Survey (NHIS), which is a large-scale cross-sectional survey based on stratified multistage systematic sampling, with samples obtained in each county/municipality (stratum) proportional to population size. This nationally representative

survey was conducted using personal interviews with individuals between the ages of 12 and 64 years in private households. In addition to health-behavior-related information (e.g., smoking, drinking, exercise, betel nut chewing, eating patterns), data were also collected on respondents' health status, medical service utilization, and medical care utilization. Trained interviewers collected the data for this survey using both computer-assisted in-person interviews and computer-assisted self-administered interviews. A total of 30,960 participants completed the survey, representing a response rate of 75.2%. The focus population for this study was women aged 20–50 years, with the exclusion criteria being having difficulties with performing activities of daily living (e.g., bathing, dressing, eating, getting in and out of chairs, walking, and using the toilet), being retired or a student, having fallen or had been hospitalized within the 1-month period before the survey, and not providing their own answers. In addition, eligible individuals had to have answered the core items in both parts of the questionnaire. Thus, 5,147 respondents were qualified and included in the analysis in this study. The ethics committee of the National Health Research Institutes approved this research, and prior approval was given by the institutional review board of St. Martin De Porres Hospital (Code 19C004).

Dependent Variable: Leisure-Time Physical Activity

WHO defines physical activity as any bodily movement produced by skeletal muscles that requires energy expenditure. Physical activity may be assessed in terms of frequency, duration, or intensity (WHO, 2018). The focus in this study was on LTPAs, as these activities represent voluntary behavior that is easily altered and indicative of individual health status. LTPA has been argued as being more important to human health than other forms of physical activity (Lin et al., 2010). The metabolic equivalent (MET) score, commonly used to measure physical activity intensity (Ainsworth et al., 2011), is calculated as the ratio of the working metabolic rate to the resting metabolic rate, with 1 MET defined as the energy cost of sitting quietly (i.e., the equivalent to a caloric consumption of 1 kcal/kg per hour). The energy costs of moderate and vigorous activity are, respectively, 3–6 METs and > 6 METs (Centers for Disease Control and Prevention, 2018). On the basis of current physical activity guidelines, healthy women between 20 and 50 years old should dedicate ≥ 150 minutes per week to moderate physical activity and ≥ 75 minutes per week to vigorous physical activity or to an appropriate combination of the two (Piercy et al., 2018).

In this study, LTPA was assessed using a self-report questionnaire covering 13 types of physical activity and ranging in score from low to vigorous intensity. The question items, including “In the past week, in what types of sports did you participate?”, “How often do you engage in physical activities?”, “How much time do you spend on each physical activity?”, and “Do you experience shortness of breath when engaging in

physical activity?”, were each asked once for each type of physical activity. The MET was then calculated based on the type of physical activity and breathing patterns during physical activity (Wen et al., 2007). The results for the five activities in which the respondent most frequently engaged were then summed. The respondents were categorized according to LTPA level based on the WHO recommendations, as follows:

- Regular: moderate aerobic exercise (3–6 METs) for at least 150 minutes or vigorous aerobic exercise (> 6 METs) for at least 75 minutes during the previous week
- Insufficient: moderate aerobic exercise for < 150 minutes or vigorous aerobic exercise for < 75 minutes during the previous week
- Inactive: no physical activity or a combined LTPA of < 10 minutes during the previous week

Independent Variable: Multiple Roles

LTPA was assessed as a function of the roles assumed by women based on employment and family status. Employment status was categorized as full-time (≥ 40 hours or more per week), part-time (≤ 39 hours per week), unemployed, and stay-at-home mother. As previously noted, retired, disabled, and others were omitted from the multivariate analysis. The distribution of employment status and other variables is listed in Table 1. Family type included living with a partner (yes for married or cohabiting and no for divorced, separated, or widowed) and living with children (0 or ≥ 1). Multiple roles were defined as having a partner, having at least one child, and being engaged in full-time employment. This variable was scored between 0 and 3, with 0 = *unemployed and living alone*, 1 = *employed full-time or living with a partner or living with children*, 2 = *children and employment, partner and employment, partner and children*, and 3 = *employed full-time and living with a partner and children*.

Control Variables

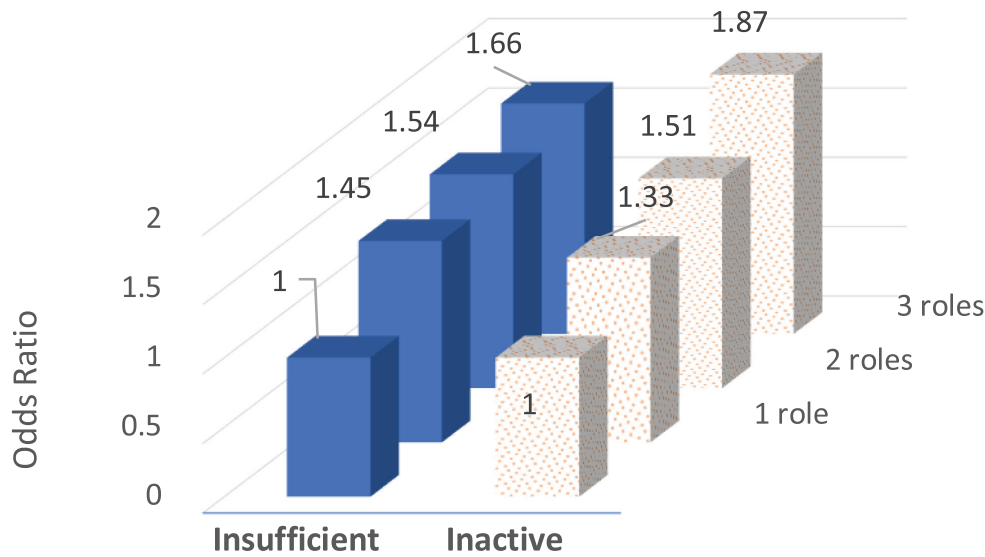
Several covariates were considered in this analysis, including age (20–30, 31–40, and 41–50 years), education (basic: ≤ 9 years; medium: 10–12 years; high: > 12 years), household income per month (< 50,000, 50,000–100,000, and $\geq 100,000$ New Taiwan dollars), and health status. Health-related covariates included chronic disease (hypertension, diabetes, stroke, heart disease, chronic pulmonary disease, and high blood lipid; 0 = *none*, 1 = *at least one*), depression (0 = *not depressed*, 1 = *depressed*), and body mass index (BMI; underweight: < 18.5; normal: 18.5–23.9; overweight: 24–26.9; and obese: ≥ 27).

Statistical Methods

Analysis was conducted using SPSS Version 27.0 (IBM, Inc., Armonk, NY, USA) and SAS V9.1 (SAS Institute, Inc., Cary, NC, USA) for Windows. Multinomial logistic regression was used to investigate the relationship between multiple roles and types of physical activity. The results are presented as odds ratios (ORs) using the regular group as a reference category.

Figure 1

Odds Ratios of Engaging in Insufficient Leisure-Time Physical Activities and Inactive by the Number of Roles



Two models were used to determine whether the number of roles was correlated statistically with insufficient exercise or inactivity (Figure 1). Whether each role was statistically correlated with LTPA levels was then tested (Table 2), and statistical significance was set at $\alpha = .05$.

Results

The sociodemographic characteristics of the 5,147 qualified respondents (mean age = 35.5 years, $SD = 3.2$) are presented in Table 1. Half (51.8%) of the respondents were inactive, 30.7% were insufficiently physically active, and 17.5% were regularly active. The proportion of women with inactive life-style decreased with age, with increases in age significantly associated with more engagement in LTPAs ($p < .0001$). Women

with higher incomes ($p < .0001$), higher educational levels ($p < .0001$), a normal BMI ($18.5 \leq BMI < 24$; $p < .0001$), a full-time job ($p < .05$), or a chronic disease ($p < .01$) as well as those living with children ($p < .0001$) and those not suffering from depression ($p < .0001$) were more likely to be in the regular LTPA group.

The employment status of women by marital and parental status is shown in Table 2. The single women in this study tended to have jobs, whereas married women tended to be housewives ($p < .0001$). Having fewer children increased the likelihood that a woman was employed, whereas having more children increased the likelihood of being a housewife ($p < .0001$).

Multinomial logistic regression was used to obtain the adjusted OR for each role to identify statistically significant correlations between insufficient LTPA and inactive lifestyles.

Table 2

Employment Status of Women by Marital Status and Parental Status

Variable	Employee (%)	Housewife (%)	Other Nonemployed (%)	<i>p</i>
Marital status				< .001
Married/cohabiting	62.8	35.0	2.2	
Divorced/widowed/separated	75.1	15.3	9.6	
Single	88.7	1.9	9.5	
Married/cohabiting				< .001
No children	76.8	19.2	4.0	
One	65.5	31.8	2.7	
Two	64.3	33.3	2.4	
Three or more	58.1	40.2	1.7	
Lone mother (with child)				.106
One	73.2	10.7	16.1	
Two	80.2	11.0	8.8	
Three or more	77.3	20.4	2.3	

Note. Other nonemployed: Nonemployed includes unemployed and retired/disabled.

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The ORs of insufficient and inactive in various roles are presented in Figure 1. Compared with unemployed women living without a partner or children, those women with two to three roles were more likely to lead an inactive lifestyle and not engage in sufficient LTPAs. In other words, women who assumed a larger number of roles were at a greater risk of leading an inactive lifestyle (0 role: OR = 1; one role: OR = 1.33, 95% CI [0.97, 1.82]; two roles: OR = 1.51, 95% CI [1.07, 2.12]; three roles: OR = 1.87, 95% CI [1.32, 2.65]) and of having insufficient LTPA (0 role: OR = 1; one role: OR = 1.45, 95% CI [1.05, 2.02]; two roles: OR = 1.54, 95% CI [1.04, 2.26]; three roles: OR = 1.66, 95% CI [1.10, 2.50]).

Moreover, being a mother was found to increase risk of inactivity (children: OR = 2.34, 95% CI [1.08, 5.10]) and insufficient LTPA (children: OR = 3.04, 95% CI [1.39, 6.66]), as shown in Table 3. In terms of individual roles, the burden of motherhood was found to be significantly higher than that of being a wife or an employee. However, holding a job appeared to not affect LTPAs. In addition, the respondents who were mothers were significantly less likely to engage in sufficient LTPA or be inactive (inactivity: OR = 2.23, 95% CI [1.48, 3.37]; insufficient: OR = 1.64, 95% CI [1.06, 2.53]) than their partner-role counterparts. However, when combined with employment, being a mother did not significantly reduce the

Table 3

Multiple Logistic Regression for Estimating the Adjusted Odds Ratio for Statistical Correlation With Insufficient Leisure-Time Physical Activities and Inactivity

Variable	Inactive		Insufficient	
	AOR ₁	95% CI	AOR ₂	95% CI
Multiple roles				
Single, without children, unemployed	Reference		Reference	
1 (living with partner)	2.23	[1.14, 4.39]*	1.68	[0.84, 3.36]
1 (employed) ^a	1.34	[0.98, 1.82]	1.37	[0.99, 1.90]
1 (living with children)	2.34	[1.08, 5.10]*	3.04	[1.39, 6.66]*
2 (living with children, employed)	1.64	[0.99, 2.72]	1.07	[0.62, 1.86]
2 (living with partner and employed)	2.99	[1.65, 5.42]*	1.59	[0.85, 2.95]
2 (living with partner and children)	2.23	[1.48, 3.37]*	1.64	[1.06, 2.53]*
3 (living with partner and children, employed)	3.01	[2.01, 4.53]*	1.73	[1.11, 2.69]*
Age (years)				
20–30	Reference		Reference	
31–40	0.81	[0.62, 1.04]	0.98	[0.75, 1.30]
41–50	0.42	[0.32, 0.55]*	0.68	[0.51, 0.91]*
Household income per month (NTD)				
< 50,000	Reference		Reference	
50,000–100,000	0.68	[0.54, 0.84]*	0.91	[0.73, 1.15]
> 100,000	0.58	[0.44, 0.77]*	0.91	[0.69, 1.21]
Educational level (years)				
0–9	Reference		Reference	
10–12	0.89	[0.64, 1.24]	1.02	[0.72, 1.44]
> 12	0.52	[0.37, 0.72]*	0.90	[0.63, 1.27]
Chronic disease status				
0	Reference		Reference	
≥ 1	0.85	[0.66, 1.09]	1.01	[0.78, 1.31]
Depression diagnosis				
No	Reference		Reference	
Yes	1.42	[1.15, 1.76]*	1.07	[0.86, 1.34]
Body mass index (BMI)				
< 18.5	1.80	[1.27, 2.55]*	1.51	[1.05, 2.17]*
18.5 ≤ BMI < 24.0	Reference		Reference	
24.0 ≤ BMI < 27.0	1.03	[0.80, 1.34]	1.06	[0.82, 1.38]
≥ 27.0	1.02	[0.76, 1.37]	0.71	[0.52, 0.97]*

Note. AOR = adjusted odds ratio; NTD = New Taiwan dollar.

^a Full-time.

* *p* < .05.

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likelihood of engaging in sufficient LTPA or of being inactive. When combined with the role of being both a parent and an employee, the likelihood of LTPA inactivity was significantly increased ($OR = 2.99$, 95% CI [1.65, 5.42]), although the likelihood of insufficient LTPA did not increase. These three roles had a large effect on LTPA inactivity and insufficiency (inactivity: $OR = 3.01$, 95% CI [2.01, 4.53]; insufficiency: $OR = 1.73$, 95% CI [1.11, 2.69]). As shown above, the women in this study who took care of their children alone had the lowest LTPA, followed by women who took on a larger variety of roles.

The women in this study aged 41–50 years were less likely than those aged 20–30 years to be inactive ($OR = 0.42$, 95% CI [0.32, 0.55]) or to engage in insufficient LTPA ($OR = 0.68$, 95% CI [0.51, 0.91]). The likelihood of living an inactive lifestyle or engaging in insufficient LTPA was found to be inversely proportional to age. In addition, women with a higher household income (50,000–100,000 dollars: $OR = 0.68$, 95% CI [0.54, 0.84]; > 100,000 dollars: $OR = 0.58$, 95% CI [0.44, 0.77]) or better education were less likely to lead an inactive lifestyle (> 12 years: $OR = 0.52$, 95% CI [0.37, 0.72]). Moreover, women suffering from depression were more likely to lead an inactive lifestyle ($OR = 1.42$, 95% CI [1.15, 1.76]), whereas those with BMI < 18.5 were more likely to lead an inactive lifestyle ($OR = 1.80$, 95% CI [1.27, 2.55]) or to engage in insufficient LTPA ($OR = 1.51$, 95% CI [1.05, 2.17]). No relationship between chronic disease and LTPA was found.

Discussion

NHIS data are nationally representative and valid for use as an empirical basis for policy implementation. The latest edition of this database, released in 2013, was used in the study. The sociodemographic characteristics of the 5,147 qualified respondents (mean age at baseline = 35.5 ± 3.2 years) are listed in Table 1. Among these, 51.8% were inactive, 30.7% were insufficiently physically active, and 17.5% had a normal level of physical activity. The proportion of women with inactive lifestyles decreased with age, and these women tended to engage in more LTPAs with ($p < .0001$). Women with higher incomes ($p < .0001$), a higher education ($p < .0001$), a normal BMI ($18.5 \leq BMI < 24$; $p < .0001$), a full-time job ($p < .05$), or a chronic disease ($p < .01$) as well as those who lived with children ($p < .0001$) and those not suffering from depression ($p < .0001$) were more likely to be in the normal LTPA group.

To identify whether social changes have impacted the roles and physical activity status of women, we compared the 2013 NHIS results with more-recent data from the 2019 Taiwan Social Change Survey (Academia Sinica, 2019) for women aged 20–50 years. In terms of findings, first, the number of times respondents engaged in physical activity per week decreased 2.4 from 2.2. In this age group, there was little difference in the amount of physical activity performed in 2013 and 2019. Second, among working-age women, the proportion who held full-time jobs in 2019 (68.6%) was higher than that in 2013 (65.8%), despite the slight decrease from 54.9% in 2013

to 52.9% in 2019 of those living with their partners. These findings indicate physical activity in women and their multiple roles have changed little over the past decade or so.

The results of this study show that the respondents who were single tended to be employed outside the home and that those who lived with partners tended to be housewives. Both those who were with a partner or single were significantly more likely to be housewives when they had children. The generally accepted explanation for these findings is the phenomenon of role delegation (De Pater et al., 2010), which is a traditional approach to resolving work–family role strains. Under this approach, women (wives) handle the tasks of childrearing, and men (husbands) fulfill the role of economic provider, with women typically leaving the labor force during the early years of childrearing. However, family economic considerations and the desire of women to pursue their own career aspirations have gradually introduced other alternative approaches, including reducing overall family role demands (through delayed childbirth or having fewer children) and the wife/mother taking part-time employment. The other category was decreasing the level of involvement in the work role. Women with and without young children tended to have different work patterns, mothers were found to be less likely to work than nonmothers, and mothers with outside employment averaged fewer work hours than nonmothers. The generally accepted explanation for these findings is that many mothers respond to the competing demands of work and parenthood for their time and energy by reducing their commitment to work outside the home.

Women with only a single role, that is, living with children or with a partner, were more likely to be inactive. In addition, LTPA seems to be relatively unsustainable and easily interrupted for single women with children. Abundant evidence in the literature has highlighted single parenthood as a common risk factor for mental disorders, particularly during early parenting (Liang et al., 2019; Vaingankar et al., 2020), and as a factor leading to poor received and perceived social support (Vaingankar et al., 2020). The finding that women with children tend to be inactive or engage in insufficient physical activity is also consistent with previous research (Cook & Gazmararian, 2018; Quinn et al., 2020; Schoeppe et al., 2018). Traditionally, women have borne the responsibility of taking care of family members, especially young children (Lewis & Ridge, 2005), causing them to lose leisure time because of issues such as fatigue, childcare, and time conflicts (Carver et al., 2020; Lloyd et al., 2016).

Women with young children generally have less time for leisure and physical activities than their counterparts with older or no children. Infants and preschool-aged children depend completely on their parents for their needs, including, among other things, bathing, feeding, and comforting. In contrast, children in middle childhood are able to assume partial responsibility for their basic needs, reducing the time required for parenting tasks, with adolescent children requiring the least amount of time from their parents (Negraia et al., 2018). Unlike men, who typically share in childcare responsibilities only when unemployed, women work as

employees as well as caregivers to their children and thus face greater demands on their time and a paucity of leisure time (Nicodemo & Waldman, 2009). In this study, mothers reported greater strain than did workers. Currently, it is normal for women to continue working full-time after marrying and having children. Long working hours mean less time for LTPAs. It is often difficult to distinguish female leisure activities from a variety of overlapping activities (Bittman & Wajzman, 2000). Gender stereotype norms make it difficult for women to participate in physical activity because of childrearing and domestic responsibilities (Mielke et al., 2018; Wilson et al., 2022). Thus, women seem to have less leisure time than men. Having a partner or full-time job increases the risk of inactivity and may lead to an inactive lifestyle. Nonetheless, among working mothers, the main impediments to physical activity are family responsibilities, guilt, lack of support, scheduling constraints, and work responsibilities (Mailey et al., 2014).

Values pertaining to employment vary from individual to individual and reflect the influence of social norms, interpersonal interactions, and work experiences (Rosso et al., 2010). By psychologically locating themselves in groups, individuals reduce uncertainty by establishing clearer conceptions of self and self-understanding (Hogg & Terry, 2000). Scholars have described ways in which families can influence the meaning of work within the overall context of their lives. First, family responsibilities can impose strains on individuals by demanding large proportions of their time, energy, and economic resources. As financial demands from the family increase, economic rewards become increasingly salient, making work increasingly important to economic well-being (Rosso et al., 2010). The family unit may also make it easier for individuals to perform well in the workplace by providing a supportive and relaxing environment in which one can recover from the demands of work (Rosso et al., 2010). Meaning of work and family are likely to show a reciprocal relationship. Generally speaking, work promotes health by acting as a buffer against adverse health effects through the provision of social support. Adults spend much time at work, which does not necessarily have a negative effect on LTPAs.

Women who assume a greater number of roles tend to engage in less LTPA. Women who assume two or three roles are far more likely to have insufficient LTPA than women without a partner, children, or job. Overall, we found the risk of inactivity to be proportional to the number of roles shouldered. These findings are in line with the tenets of role strain theory (Gordon et al., 2012). The roles of employee and partner tend to consume considerable time and energy. Living with a partner often entails performing obligatory unpaid work from food preparation to car care. Gender norms assign more family responsibilities to women, which imposes a dual burden on women, especially mothers, as men do not generally assume a corresponding increase in domestic labor. Women in distinctive roles are likely to face difficulties in performing their self-perceived role obligations (Berger & Bruch, 2021), which often leads to work–family conflicts (Borgmann et al., 2019; Sheikh et al., 2018). Elevated stress and strain

levels resulting from multiple roles have been shown to adversely affect well-being (Borgmann et al., 2019) and engagement in LTPAs. Moreover, stressors associated with parenthood can adversely affect parental well-being (Kristjansdottir et al., 2020).

Tensions between employment and family-life-related obligations have been highlighted in numerous studies (Kelliher et al., 2019; Lewis & Ridge, 2005). The analysis in this study found having a partner with a full-time job to be negatively associated with LTPA, whereas living with children and holding a full-time job did not appear to interfere with LTPA. One study urged the encouragement of physical activity in women as a form of care because it makes it easier for them to cope with the challenges of being mothers by expanding their life experiences (Lewis & Ridge, 2005). This inconsistency is difficult to explain but may be attributable to differences in the measures used. In this study, data were not collected on the age or number of children living with women in the sample, nor was time spent on childcare measured. As previously explained, women with younger children likely have less time for LTPA than their peers with older or no children (Negraia et al., 2018). Further analysis will need to be conducted to unravel the effects of age and number of children on the time constraints of mothers.

This study is affected by several limitations. First, the cross-sectional design did not allow the identification of causal relationships. Second, the effects of social desirability and recall bias, which often affect self-report data, could not be assessed. Third, LTPA is only one aspect of physical activity and thus provides no insight into the effects of work and commuting. Fourth, although energy expenditure tends to vary from person to person, the energy cost of each movement was not measured directly in this study. However, our categorization of LTPA level was based on the duration, intensity, and frequency of each activity. Fifth, information on the age of cohabiting children and whether subjects were also responsible for caring for grandchildren or parents was not collected. However, to mitigate this omission, participant age was limited to between 20 and 50 years. Sixth, women usually assume the role of caregivers in the family, which in many cases also includes older relatives. However, because of database limitations, data on caring for older relatives were unavailable to this study. Finally, the focus of this study was exclusively on the effects of assuming multiple roles. Other factors at the individual, interpersonal, environmental, regional, policy, and global levels were not addressed.

This study has several strengths. First, it was the first to examine the relationship between multiple roles and LTPA, and a thorough analysis of LTPAs among working-age women was conducted. Second, the large size of the study sample (5,000 nationally representative respondents) qualifies this study as a community-based study of LTPAs in Taiwan. Third, this study enhances scholarly understanding of the role of family and employment in shaping LTPA behavior among women, with the results suggesting that work–family issues should be addressed in health promotion programs to promote LTPAs in this population. Finally, our results provide converging evidence in support of role strain theory.

Conclusions

Having multiple roles was identified in this study as a barrier to LTPA in women, with role strain theory providing an explanation for this finding. Single mothers with children were found to be less active than partnered mothers. Thus, appropriate social support programs and screening measures are necessary to reduce further disparities. In addition, the multiple demands on working-age women limit the time available for LTPAs, particularly among those living with a partner and children and engaged in full-time work. Sustainable physical activity resources should be developed and provided to women through the encouragement of their partners in housework to better promote physical activity interventions for working-age women. Future research should focus on clarifying the effect of age and number of children on maternal time constraints, measuring the time women spend on parenting, and measuring the time women living with a partner spend on housework. The findings of this study highlight the importance of relationship-based intervention strategies to enhance and maintain healthy, regular physical activity among working-age women.

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