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# The influence of housing on sexual and reproductive health status and service utilization among Filipina migrant domestic workers in Macao (SAR), China: A population survey

Grace Yi [a,b], Li Liu [b], Michael Manio [c], Carl Latkin [d], Brian J. Hall [a,d,*]

[a] New York University (Shanghai), 1555 Century Ave, Pudong, Shanghai 200122, People's Republic of China
[b] Population Family and Reproductive Health, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, USA
[c] Li Ka Shing Faculty of Medicine, The University of Hong Kong, Hong Kong (SAR), People's Republic of China
[d] Health, Behavior, and Society, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, USA

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ABSTRACT

*Objective:* Sexual and reproductive health (SRH) and service utilization among female migrant domestic workers are under-studied. No studies to date have investigated the unique health vulnerabilities that affect female foreign domestic workers. The objective of this study was to investigate how stay-in and stay-out living conditions in domestic work may differentially affect SRH status, service utilization, and sexual risk behavior among female migrant domestic workers in Macao (SAR), China.

*Methods:* Data were analyzed from a cross-sectional survey conducted between November 2016 and August 2017 among 1368 female Filipina migrant domestic workers living and working in Macao. Participants were recruited through respondent-driven sampling. Bivariable and multivariable logistic regression analyses were used to assess relationships between living context and outcomes of interest.

*Results:* Domestic workers' living context (i.e. stay-in versus stay-out) was significantly related to sexual risk behavior patterns and SRH status and service utilization. Compared to stay-out workers, stay-in workers had reduced odds of sexual risk behaviors but were also more likely to report that their sexual partners were likely to have concurrent sexual partners. In addition, stay-in workers had significantly decreased odds of having visited an OBGYN in Macao in the past year.

*Conclusions:* This research is the first to evaluate the impact of stay-in and stay-out conditions within a foreign domestic worker population. This study further provides novel evidence of contextual factors (e.g. financial, employment, living conditions) that contribute to inequalities in SRH status and service utilization among Filipina migrant domestic workers. Results indicate that living context is significantly correlated with sexual risk behaviors, SRH status, and service utilization among domestic workers in Macao, highlighting the need to more effectively tailor specific interventions to meet female domestic workers' needs.

## 1. Introduction

With over 67 million domestic workers worldwide, the domestic work sector is a major contributor to the global workforce (Gallotti, 2015). Domestic workers, approximately 80% of whom are women, are among the most vulnerable groups in informal employment (ILO, 2015). Tasked with cleaning, cooking, taking care of dependents, and other household duties, domestic workers are typically employed by private households and may reside in the employer's household (stay-in worker) or live in his or her own residence (stay-out). Frequently solicited under unclear terms of employment or unregistered altogether, domestic workers are often excluded from labor legislation and subject to exploitation by employers. Domestic workers globally have reported working excessively long hours with low wages, restricted movement and freedoms, and physical, sexual, and emotional abuse from employers (ILO, 2015).

With a migrant workforce of 2.3 million overseas Filipino workers (OFW), the Philippines is one of the leading labor-sending countries in the world (ILO, 2015). Domestic workers comprise a significant proportion of this OFW workforce, with nearly 314,000 women in the sector (Public Security Police Force of Macau, 2018). Sexual and reproductive health (SRH) issues are widely prevalent among female migrant work-

* Corresponding authors.
*E-mail address:* brianhall@nyu.edu (B.J. Hall).

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ers, particularly so for those such as domestic workers who migrate to high-income countries from low- and middle-income countries (LMICs) (Rade et al., 2018). Many of these women lack adequate sexual health knowledge and equal access to necessary health services (Rade et al., 2018).

The country-wide prevalence of HIV in the Philippines is 0.05%, among the highest in the Southeast Asian region (Hall et al., 2020). Surveillance data report that OFWs have accounted for 11% of HIV cases since 1984 and suggest that OFWs may remain a key population at risk of acquiring HIV (Hall et al., 2020). Domestic work conditions – excessively low wages, for example, or exploitation and abuse from employers with whom domestic workers may be living – may further exacerbate OFW domestic workers' vulnerability to infection and/or restrict their access to care. Indeed, a formative qualitative study among migrants in Macao suggested that Filipina domestic workers engage in transactional sex or other risky sexual behaviors (Garabiles et al., 2017), emphasizing the need for both increased availability and uptake of SRH services.

Though countries like the Philippines with high outwards-migration have employment agencies and pro-migration laws, their governments often struggle to ensure the health and safety of their migrant workers abroad (Hall et al., 2019b). Because pre-migration STI testing and counseling is not mandatory for OFWs, they are unlikely to know about their sexual health status and do not learn about potential health risks or treatment options abroad (Hall et al., 2019b). In host countries, migrant workers report lower rates of SRH service utilization such as HIV testing due to stigma, cost, difficulty navigating health systems, and cultural barriers (Rade et al., 2018; Norredam et al., 2010; Lu et al., 2012). A systematic review on migrant workers living in high-income countries further reported that migrants had increased HIV prevalence and higher frequency of delayed HIV diagnosis compared to the general population (Rade et al., 2018). Domestic workers, whose working conditions subject them to greater potential economic or physical exploitation compared with other migrant workers, may be particularly affected by this disparity.

Significant proportions of foreign migrant women work in domestic work capacities. In order to more effectively inform migration policy discussions and health and economic advocacy efforts, it is crucial to understand how particular vulnerabilities that arise in domestic work may interplay with workers' sexual and reproductive health status and utilization of SRH services.

### 1.1. Study rationale and objectives

Research on sexual and reproductive health risk and service utilization among female migrant workers is limited, and research on migrant domestic workers' vulnerability is further limited. Although female domestic workers comprise a major proportion of the global migrant workforce, no existing studies to date have sought to identify how unique vulnerabilities that migrant domestic workers face may affect their SRH status and utilization of SRH services.

There were an estimated 12,736 Filipina domestic workers employed in Macao as of November 2016 (Public Security Police Force of Macau, 2018). Unlike domestic work in most other global contexts, in which most domestic workers stay-in, migrant domestic workers in Macao, China, have the option of living with their employers (stay-in) or living apart from employers (stay-out), which provides a salient opportunity for comparison. Stay-in workers are typically under increased scrutiny and control by employers (Hall et al., 2019a), which may heighten their vulnerability to abuse. Stay-out workers frequently experience overcrowding and poor-quality housing, uncertain sanitation, and safety and privacy concerns (Hall et al., 2019a). The impact of stay-in or stay-out conditions on domestic workers' sexual health or utilization of SRH-related services is unknown.

The present study sought to identify the influence of contextual and other sociodemographic correlates on SRH status and service utilization. The main objective of this study was to investigate how stay-in vs. stay-out living conditions in domestic work affect SRH status, sexual risk behaviors, and SRH-related service utilization among Filipina domestic workers in Macao (SAR), China.

## 2. Methods

### 2.1. Study design

The design was a cross-sectional survey conducted between November 2016 and August 2017 among Filipina migrant domestic workers living and working in Macao. Participant eligibility was defined as: 1) Filipina domestic worker, 2) at least 18 years of age, 3) ability to provide informed consent, and 4) valid work visa or a residence ID card for Macao. Domestic workers in Macao obtain their work permits through employer sponsorships, so all domestic workers have valid working permits.

A total of 1368 Filipina domestic workers were enrolled in the study, representing over 11% of the entire Filipina domestic workforce in Macao at the time of study. Of those enrolled, 1186 (87%) reported sexual debut and were included in the study.

Eligible participants were recruited using respondent-driven sampling (RDS), which is a link-tracing sampling strategy in which study participants recruit their peers to participate in the survey (Heckathorn, 1997). A select number of participants were trained as 'seeds' and were asked to refer up to five eligible peers. Seeds were selected for well-connected social networks and diversified based on age, location of residence, and stay-in or stay-out status. Subsequent recruits could recruit up to five more individuals. All participated in a standardized training on RDS recruitment techniques and received an overview of study goals and procedures. In accordance with RDS protocol, each participant was provided a cash incentive (100MOP; ~12.50USD) for participation and for each successful recruitment (20MOP; ~2.50USD). Data were collected using tablet devices. The research ethics panel of the university approved the current study (MYRG-2015-00111).

### 2.2. Patient and public involvement

Domestic workers were involved in the priority setting exercise that developed the aims for the current study (Hall et al., 2019b). They were also involved in ensuring the items and the measures were adequately translated and captured their lived realities through extensive cognitive interviewing. Since this was a respondent driven sampling study, members of the community were engaged as partners throughout the recruitment process. All results from the PRIDE study are disseminated through leaders of migrant worker community organizations.

### 2.3. Measures

*SRH variables:* Sexual and reproductive health measures included five risk behavior variables and five RTI symptom variables. Participants self-reported if they, in the past year, had oral, vaginal, or anal sex without protection over half the time, had sex while drunk, or had transactional sex (i.e., in exchange for money/gifts). Responses were coded into binary variables (0=no, 1=yes). Participants also self-reported the number of past-year sexual partners; those with three or more were coded as 1=yes (high risk) while all other answers were coded as 0=no. Participants also reported the likelihood that their current sexual partner was engaging in sexual activity with other individuals (extremely unlikely, unlikely, neutral, likely, or extremely likely). For the variable measuring likelihood that participants' partners have concurrent sexual partners, a "likely" or "extremely likely" response was coded as 1=yes with all other answers coded as 0=no. Two binary composite variables were generated to assess whether participants reported at least one of the above five sexual risk behaviors or two or more sexual risk behaviors (0=no, 1=yes, respectively). Participants were also asked a series of questions pertaining to reproductive tract infection (RTI) symptoms and

self-reported whether, in the past year, they had experienced: vaginal pain or burning during urination, vaginal or anal sores, boils, or lesions, vaginal or anal itching, abnormal vaginal discharge, or pain in the lower stomach unrelated to menstruation or IUD. Two binary composite variables were generated to assess whether participants reported at least one of the above five RTI symptoms or two or more RTI symptoms (0=no, 1=yes, respectively).

*Sociodemographic characteristics:* Sociodemographic variables included stay-in or stay-out status, age, marital status, educational attainment, months working as an OFW, number of children, and health status. Health status was self-reported as very good, good, average, poor, or very poor.

*Service utilization:* SRH-related service utilization measures included: 1) having visited an OBGYN in the past year or 2) having received an HIV test in the past year. All service utilization variables were measured as binary variables, coded "1″ for affirmative responses and "0″ for dissenting responses.

*Financial and employment context variables:* Financial stability was assessed using two binary measures: whether participants were currently in debt (0=no, 1=yes) and had savings for themselves (0=no, 1=yes). Additional continuous financial variables included monthly salary (in MOP) and number of dependents upon monthly remittances. Measures related to employment context included employer relationship rated on a Likert-type scale (1=very unsatisfied, 10=very satisfied) and a categorical variable of number of days off per month (fewer than four, four, greater than four).

*Mental health variables:* Psychosocial measures of social support and symptoms of depression and anxiety were assessed based on the Multidimensional Scale of Perceived Social Support (MSPSS) (Zimet et al., 1988) (Cronbach's Alpha=0.97), Patient Health Questionnaire (PHQ-9) (Kroenke et al., 2001) (Cronbach's Alpha=0.89), and Generalized Anxiety Disorder (GAD-7) (Spitzer et al., 2006) (Cronbach's Alpha=0.92), previously validated in the population (Garabiles et al., 2019). MSPSS score was continuous, while PHQ-9 and GAD-7 provisional diagnoses were dichotomized variables with standard cut-scores of 10.

## 3. Analyses

First, descriptive analysis was used to describe sociodemographic characteristics, sexual risk behaviors, RTI symptoms, and SRH service utilization. Crude and RDS-adjusted prevalence estimates and 95% confidence intervals (CIs) were reported. RDS-adjusted weights were generated in STATA SE based on the inverse of each participant's domestic worker network size, rescaled to sum to the total sample size.

In producing the descriptive analysis, missing values in the data were examined. A two-sample *t*-test for missing completely at random (MCAR) in sociodemographic data was used to ascertain whether the probability of missing cases was independent of the values of sociodemographic variables between groups. We applied listwise deletion of missing data on number of financial dependents ($n = 9$), monthly salary ($n = 2$), and PHQ-9 ($n = 1$), which is an approach that has been found to produce unbiased parameters for MCAR data (Kang, 2013). There were no missing data for sexual risk behavior, RTI symptoms, and SRH service utilization variables.

Next, in order to examine the impact of domestic workers' stay-in/out status on sexual risk behaviors, RTI symptoms, and SRH-related service utilization, prevalence estimates were stratified and tabulated by stay-in/out status. Bivariable associations are presented using unadjusted odds ratio for dichotomous correlates. All analyses were considered statistically significant at $p<0.05$ level. Finally, to further ascertain the independent effects of stay-in and stay-out conditions on SRH-related service utilization, we used multivariable logistic regressions to obtain crude, adjusted, and RDS-weighted adjusted odds ratios. These multivariable regression models allowed us to understand the individual contributions of various socioeconomic variables to SRH status and service utilization. The regression models were adjusted for possible confounding variables, including sociodemographic, financial/employment, health, and behavioral characteristics. Data were analyzed using STATA SE (Version 15) (Statacorp, LP, College Station, TX).

## 4. Results

### 4.1. Sociodemographic characteristics

The distribution of demographic, financial, employment, and health characteristics among participants is shown in Table 1. Over half of the sample comprised women aged 35–55 (65.7%) and reported an educational attainment of high school or vocational school (61.9%). Approximately half of the sample was married or cohabitating (56.0%). The majority of participants had at least one child (83.2%), with 34.5% reporting having 3 or more children. The majority of the sample had worked as an OFW for 1–10 years. The sample was evenly split between stay-in (49.0%) and stay-out (51.0%) workers. Approximately half of the sample reported current indebtedness (54.6%) and having no savings for self (42.6%), with an average of 3.9 (± 3.4) financial dependents. Half of the sample self-reported "normal" health status (52.9%), followed by "good" (28.8%) and "very good" (12.2%). Approximately 18% of the sample fell within the threshold of a provisional diagnosis of depression per PHQ-9 guidelines, while 17.7% of the sample fell within the threshold of a provisional GAD-7 diagnosis.

### 4.2. Sexual behaviors and SRH service utilization by domestic worker characteristics

Stay-in/out status (i.e., living with or apart from employer) among the domestic worker sample was significantly correlated to several past-year sexual risk behaviors and SRH-related service utilization (Table 2). Compared with stay-out domestic workers, those who lived with their employer had 21% reduced odds of having sex without protection over half the time in the past year (OR 0.79, $p = 0.047$), 42% reduced odds of having sex while intoxicated in the past year (OR 0.58, $p = 0.004$), 92% increased odds of reporting that their partners were likely to have concurrent sexual partners (OR 1.92, $p = 0.043$), and 26% reduced odds of reporting at least one sexual risk behavior in the past year (OR 0.74, $p = 0.01$). In addition, stay-in workers had 43% reduced odds of visiting an OBGYN in Macao in the past year compared with stay-out workers.

### 4.3. Factors associated with SRH service utilization

In order to evaluate the independent effect of stay-in vs. stay-out living conditions on these service utilization measures, we conducted a multivariable logistic regression (aOR in Table 3) in which we adjusted for potentially confounding factors: demographic characteristics, financial situation, employment characteristics, relationship with employer, physical and mental health characteristics, social connectedness, sexual behaviors, and self-reported RTI symptoms. Each model was further evaluated after adjusting for RDS sample weights (RDS aOR in Table 3).

After adjusting for possible contextual confounders listed above, stay-in domestic workers had significantly lowered odds of having visited an OBGYN in the past year, with 66% reduced odds as compared to stay-out workers (aOR 0.34, $p = 0.006$). There was no relationship between stay-in vs. stay out conditions and a past-year HIV test after adjusting for all confounders.

## 4. Discussion

This study investigated the influence of housing context on sexual and reproductive health status and service utilization among Filipina migrant domestic workers in Macao (SAR), China. As indicated in formative qualitative interviews with OFWs in Macao, SRH services are relatively underutilized among domestic workers in Macao due to issues of cost, stigma, and accessibility (Hall et al., 2019b). Therefore, we used

**Table 1**
Crude and respondent-driven sampling (RDS)-adjusted prevalence estimates of sociodemographic characteristics ($N = 1186$).

| | Crude | | RDS-weighted | |
|---|---|---|---|---|
| | *N* | % | % | 95% CI |
| *Demographic Characteristics* | | | | |
| Age group | | | | |
| 18–25 | 31 | 2.6 | 1.8 | 1.0, 3.3 |
| 26–35 | 280 | 23.6 | 30.5 | 24.3, 37.6 |
| 36–45 | 499 | 42.1 | 37.5 | 31.8, 43.5 |
| 46–55 | 308 | 26.0 | 22.4 | 18.1, 27.5 |
| >55 | 68 | 5.7 | 7.7 | 3.6, 16.0 |
| Highest level of education completed | | | | |
| Elementary | 19 | 1.6 | 1.6 | 1.0, 2.5 |
| High school | 424 | 35.8 | 35.8 | 33.1, 38.5 |
| Vocational school or associate degree | 309 | 26.1 | 26.0 | 22.4, 30.0 |
| Some college | 201 | 17.0 | 16.9 | 14.9, 19.2 |
| Bachelor's degree or higher | 233 | 19.4 | 19.5 | 17.2, 21.7 |
| Marital status | | | | |
| Single | 242 | 20.4 | 27.3 | 20.4, 35.6 |
| Married/Cohabitating | 664 | 56.0 | 52.7 | 43.5, 63.7 |
| Widowed | 74 | 6.2 | 4.2 | 2.8, 6.4 |
| Separated/Divorced | 206 | 17.4 | 15.6 | 11.5, 22.9 |
| Number of children | | | | |
| 0 | 199 | 16.8 | 21.8 | 15.1, 30.4 |
| 1–2 | 578 | 48.7 | 42.5 | 36.4, 48.9 |
| 3 or more | 490 | 34.5 | 35.7 | 30.1, 41.6 |
| Length of time working as an OFW | | | | |
| < 1 year | 73 | 6.2 | 5.3 | 3.7, 7.5 |
| 1–5 years | 488 | 41.2 | 50.8 | 44.2, 57.3 |
| 6–10 years | 309 | 26.1 | 25.2 | 20.0, 31.3 |
| 11–15 years | 152 | 12.8 | 11.6 | 8.7, 15.4 |
| > 15 years | 164 | 13.8 | 7.1 | 5.3, 9.4 |
| Living with employer | | | | |
| Stay-in | 581 | 49.0 | 42.2 | 36.1, 48.5 |
| Stay-out | 605 | 51.0 | 57.8 | 51.5, 63.9 |
| Mismatched stay-in/out preference | 146 | 12.3 | 11.3 | 7.6, 16.3 |
| *Financial and Employment Characteristics* | | | | |
| Current indebtedness | | | | |
| Yes | 646 | 54.6 | 51.2 | 44.6, 57.7 |
| No | 540 | 45.5 | 48.8 | 42.3, 55.4 |
| Has savings for self | | | | |
| Yes | 681 | 57.4 | 52.3 | 45.6, 59.0 |
| No | 505 | 42.6 | 47.7 | 41.0, 54.4 |
| Monthly salary in MOP (±SD) | 3661 (831) | – | 3686 | 3600, 3773 |
| Number of financial dependents (±SD) | 3.9 (3.4) | – | 3.8 | 3.5, 4.1 |
| Days off per month | | | | |
| <4 | 183 | 15.5 | 14.2 | 10.6, 18.6 |
| 4 | 965 | 81.5 | 83.3 | 78.6, 87.2 |
| >4 | 36 | 3.0 | 2.5 | 1.2, 5.2 |
| Employer relationship (±SD) | 6.5 (2.3) | – | 6.4 | 6.1, 6.7 |
| *Physical and Mental Health Characteristics* | | | | |
| Self-reported general health | | | | |
| Very poor | 11 | 0.9 | 1.0 | 0.3, 2.7 |
| Poor | 62 | 5.2 | 6.0 | 3.3, 10.6 |
| Normal | 627 | 52.9 | 49.9 | 43.3, 56.5 |
| Good | 341 | 28.8 | 30.5 | 24.1, 37.8 |
| Very good | 145 | 12.2 | 12.7 | 8.9, 17.9 |
| MSPSS Total Score (±SD) | 5.3 (1.4) | – | 5.4 | 5.3, 5.5 |
| PHQ-9 Provisional Diagnosis | 214 | 18.1 | 14.6 | 11.1, 19.0 |
| GAD-7 Provisional Diagnosis | 210 | 17.7 | 17.6 | 12.3, 24.6 |

past-year OBGYN visit and past-year HIV test as proxy measures for SRH-related service utilization among Filipina domestic workers in Macao.

The first theme that emerged from our study findings indicated that domestic workers' living context (stay-in vs. stay-out) was significantly related to sexual risk behavior patterns and past SRH service utilization. As previous formative work has indicated (Garabiles et al., 2017), stay-in workers are typically under increased surveillance by employers. Stay-out workers are likely at greater liberty to engage with their peer networks than stay-in workers, leading to relatively increased sexual risk-taking. Where stay-out workers may experience relatively greater freedoms, external control over stay-in domestic workers' affairs may reduce their direct sexual risk behaviors. Results further suggest that restricted mobility may prevent stay-in workers from seeking and/or accessing necessary SRH care. Moreover, such restrictions may also hinder their ability to access SRH information and resources, severely limiting their agency to make informed decisions about their SRH health in relation to sexual partners' behaviors.

A second theme that emerged from our study findings suggested that financial and employment characteristics were significantly related to past-year uptake of HIV testing but not to uptake of OBGYN services. Those with more financial dependents had lower odds of seeking past-year HIV testing. Of note, both participants who reported current indebtedness and those who reported having personal savings had increased odds of obtaining a past-year HIV test.

The availability of OBGYN services and HIV testing in Macao may provide further insight into the relationships identified in these two

**Table 2**
Crude and RDS-adjusted prevalence estimates of sexual health and SRH utilization variables, stratified by stay-in/stay-out status ($N = 1186$).

| *Sexual health by stay-in/stay-out status* | Crude *N* (%) | RDS-weighted % | 95% CI | Stay-in *N* (%) | Stay-out *N* (%) | Odds ratio (OR) (*p*) |
|---|---|---|---|---|---|---|
| Total | 1186 | – | – | 581 | 605 | – |
| ***Past-Year Sexual Risk Behaviors*** | | | | | | |
| Had sex | 621 (52.4) | 46.6 | 40.2, 53.1 | 292 (50.3) | 289 (49.7) | 0.85 (0.16) |
| Had unprotected sex over half the time | 440 (37.1) | 37.1 | 31.2, 43.5 | 199 (34.3) | 382 (65.8) | **0.79 (0.047)** |
| Had sex while drunk | 134 (11.3) | 9.5 | 6.8, 13.0 | 50 (8.6) | 84 (13.9) | **0.58 (0.004)** |
| Had sex in exchange for money or gifts | 7 (0.6) | 1.7 | 0.4, 3.7 | 2 (0.3) | 5 (0.8) | 0.41 (0.28) |
| Had sex with 3 or more sexual partners | 17 (1.4) | 2.2 | 0.5, 9.5 | 8 (1.4) | 9 (1.5) | 0.92 (0.87) |
| Reported likelihood that partners have concurrent sexual partners | 42 (3.5) | 4.0 | 2.3, 7.0 | 27 (4.7) | 15 (2.5) | **1.92 (0.043)** |
| Reported **at least one** sexual risk behavior | 475 (40.1) | 39.1 | 33.1, 45.5 | 211 (36.3) | 264 (43.6) | **0.74 (0.010)** |
| Reported **2 or more** sexual risk behaviors | 142 (12.0) | 12.7 | 9.0, 17.9 | 63 (10.8) | 79 (13.1) | 0.81 (0.24) |
| ***Past-year RTI Symptoms*** | | | | | | |
| Pain or burning around vagina during urination | 76 (6.4) | 6.1 | 4.0, 9.1 | 37 (6.4) | 39 (6.5) | 0.99 (0.96) |
| Sores, boils, or lesions around vagina or anus | 30 (2.5) | 4.7 | 2.1, 10.5 | 15 (2.6) | 15 (2.5) | 1.04 (0.91) |
| Itching around vagina or anus | 121 (10.2) | 10.1 | 7.1, 14.0 | 57 (9.8) | 64 (10.6) | 0.92 (0.66) |
| Abnormal vaginal discharge | 78 (6.6) | 6.3 | 4.4, 9.1 | 34 (5.9) | 44 (7.3) | 0.79 (0.32) |
| Stomach pain (unrelated to menstrual period or IUD-use) | 88 (7.4) | 6.4 | 4.3, 9.4 | 41 (7.1) | 47 (7.8) | 0.90 (0.64) |
| Reported at least one RTI symptom | 232 (19.6) | 21.9 | 17.0, 27.6 | 108 (18.6) | 124 (20.5) | 0.89 (0.41) |
| Reported two or more RTI symptoms | 101 (8.5) | 8.0 | 5.6, 11.4 | 45 (7.8) | 56 (9.3) | 0.82 (0.35) |
| ***SRH Service Utilization*** | | | | | | |
| Ever visited OBGYN | 137 (11.6) | 8.1 | 6.1, 10.7 | 57 (9.8) | 80 (13.2) | 0.71 (0.07) |
| Visited OBGYN in Macao in the past year | 112 (9.4) | 7.2 | 5.2, 9.9 | 41 (7.1) | 71 (11.7) | **0.57 (0.006**) |
| Ever been tested for HIV | 341 (28.7) | 30.9 | 24.3, 38.2 | 160 (27.5) | 181 (29.9) | 0.89 (0.36) |
| Been tested for HIV in the past year | 12 (1.0) | 1.1 | 0.5, 2.9 | 7 (1.2) | 5 (0.8) | 0.96 (0.86) |

**bolded values indicate significant associations, $p < 0.05$.*

**Table 3**
Crude, adjusted, and RDS-weighted adjusted multivariable logistic regressions on SRH service utilization ($N = 1186$).

| Outcome | Past-year OBGYN visit Crude OR (p) | aOR (p) | RDS aOR (p) | Past-year HIV test Crude OR (p) | aOR (p) | RDS aOR (p) |
|---|---|---|---|---|---|---|
| ***Stay-in*** | **0.57 (0.006)** | **0.53 (0.008)** | **0.34 (0.006)** | 1.46 (0.52) | 0.97 (0.97) | 0.29 (0.14) |
| ***Demographics*** | | | | | | |
| Age | 0.99 (0.22) | 1.01 (0.39) | 1.03 (0.15) | 1.01 (0.80) | 0.97 (0.49) | 0.98 (0.32) |
| Educational attainment | 0.93 (0.25) | 0.92 (0.22) | 0.86 (0.19) | 1.17 (0.40) | 1.37 (0.16) | 1.93 (0.06) |
| Number of children | 0.97 (0.75) | 1.01 (0.96) | 1.04 (0.83) | 1.01 (0.96) | 1.37 (0.12) | 1.09 (0.75) |
| Years working as OFW | 0.90 (0.25) | 0.79 (0.06) | 0.76 (0.15) | 1.10 (0.70) | 0.97 (0.93) | 1.59 (0.25) |
| ***Financial/Employment*** | | | | | | |
| Current indebtedness | 0.99 (0.99) | 0.89 (0.63) | 0.63 (0.23) | 1.68 (0.40) | 1.95 (0.39) | **10.9 (0.036)** |
| Has savings for self | 1.45 (0.06) | 1.00 (0.31) | 1.54 (0.30) | **6.86 (0.01)** | **7.04 (0.026)** | 3.22 (0.09) |
| Monthly salary (MOP) | 1.00 (0.16) | 1.02 (0.94) | 1.00 (0.19) | 1.00 (0.60) | 1.00 (0.72) | 1.00 (0.45) |
| # of financial dependents | 0.95 (0.73) | 1.02 (0.94) | 1.03 (0.92) | **0.24 (0.01)** | **0.19 (0.017)** | **0.39 (0.026)** |
| Days off per month | | | | | | |
| <4 | REF | REF | REF | REF | REF | REF |
| 4 | 1.18 (0.57) | 0.72 (0.29) | 0.56 (0.25) | 0.37 (0.11) | **0.13 (0.01)** | 0.13 (0.06) |
| >4 | 1.81 (0.28) | 0.61 (0.55) | 1.34 (0.77) | - | - | - |
| Employer relationship | 1.04 (0.35) | 1.01 (0.86) | 1.04 (0.57) | **0.78 (0.04)** | 0.83 (0.25) | 0.86 (0.25) |
| ***Health Characteristics*** | | | | | | |
| General health | | | | | | |
| Very poor | REF | REF | REF | REF | REF | REF |
| Poor | 0.34 (0.17) | 0.18 (0.09) | 0.07 (0.10) | - | - | - |
| Normal | 0.27 (0.06) | 0.18 (0.05) | 0.14 (0.16) | **0.06 (0.01)** | 0.03 (0.07) | **0.01 (0.01)** |
| Good | **0.25 (0.048)** | **0.17 (0.045)** | 0.14 (0.17) | 0.15 (0.10) | 0.14 (0.23) | 0.39 (0.44) |
| Very good | 0.33 (0.13) | 0.26 (0.14) | 0.29 (0.42) | 0.14 (0.12) | 0.13 (0.24) | 1.14 (0.93) |
| MSPSS total score (±SD) | 1.09 (0.27) | 1.07 (0.45) | 1.13 (0.34) | **0.71 (0.03)** | 0.73 (0.15) | 0.75 (0.18) |
| PHQ-9 prov. diagnosis | 1.05 (0.84) | 1.16 (0.69) | 2.63 (0.07) | 0.91 (0.90) | 0.79 (0.77) | **0.02 (0.002)** |
| GAD-7 prov. diagnosis | 0.94 (0.83) | 0.56 (0.14) | 0.70 (0.49) | 0.93 (0.92) | 0.58 (0.69) | 8.7 (0.08) |
| ***Sexual Behaviors and RTI*** | | | | | | |
| # sexual risk behaviors | **1.36 (0.011)** | **1.40 (0.017)** | 1.45 (0.12) | 0.93 (0.86) | 0.92 (0.87) | 0.68 (0.46) |
| # of self-reported RTI symptoms | **1.27 (0.019)** | **1.42 (0.005)** | 1.27 (0.08) | **1.69 (0.02)** | **2.43 (0.01)** | 1.03 (0.95) |

*Note. GAD = Generalized anxiety disorder. PHQ = Patient Health Questionnaire. RTI = Reproductive tract infection. *bolded values indicate significant associations.*

themes. For example, OBGYN services in Macao are usually provided through private clinics and all require an initial consultation, which requires both an additional visit to the clinic and extra fee. In addition, many OBGYN offices are closed on Sundays, which is traditionally the primary day off for many domestic workers (Garabiles et al., 2017). As such, this barrier to access to OBGYN services appears to transcend financial or employment-related factors; the logistical inaccessibility of OBGYN services may serve as a significant and general barrier to those who engage in domestic work.

On the other hand, HIV testing has begun to grow more widely available in Macao. Non-governmental organizations serving migrant workers such as Caritas-Macau have begun to offer free HIV testing and coun-

seling through community outreach and events, which may make testing increasingly financially feasible and available for domestic workers to access. This may corroborate study findings in that participants who are currently indebted are still able to access HIV testing but not OBGYN services. In addition, participants who report having personal savings may also tend towards a more frugal lifestyle and prefer free or low-cost HIV testing to relatively inaccessible and expensive OBGYN services. In addition, compared with OBGYN visits, HIV testing among domestic workers is likely to be significantly more stigmatized and perceived with suspicion by employers. Domestic workers with significant responsibility to family back home may seek to avoid sensitive or potential complicating situations with employers, which may contribute to the inverse relationship between number of financial dependents and odds of seeking a past-year HIV test.

This study had several limitations. Its cross-sectional nature precludes any causal inferences or assumed directionality between risk factors and outcomes. Also, the study assessed OBGYN visits in the past year, but did not directly assess the nature or cause of the visits, nor did it identify distinctions between OB visits or non-infectious GYN visits. Similarly, the self-reported RTI symptoms was a proxy for potential symptoms of sexually-transmitted infections, which were unable to be directly measured. Condom use measures in the study only captured most frequent behaviors and thus may not have captured all acts of unprotected sex. Fear of reporting certain behaviors with regards to employment may also have led to some degree of social desirability bias. In addition, the survey used an RDS-sampling method. Previous literature has suggested that this strategy of using participant "seeds" to recruit eligible peers may affect the representativeness of the study population, as participants may tend to recruit peers with similar sociodemographic characteristics. While several studies found that the RDS sampling method produced generally representative population samples, it is important to note that caution may be required when generalizing study findings to the wider OFW population (McCreesh et al., 2012).

## 5. Conclusion

Results from this study indicate that several contextual characteristics specific to foreign domestic work significantly and differentially impact SRH-related service utilization and care-seeking among domestic workers living in Macao. These characteristics, which include stay-in/out status and financial and employment factors, disproportionately affect SRH status among domestic workers in Macao and may contribute to widening disparities in sexual and reproductive health among migrant workers at large. This study is a novel effort to characterize how various domestic work conditions may exacerbate SRH vulnerabilities that affect over 67 million workers globally. This research indicates that contextual contributions *within* the domestic work sector, such as specific living context and financial/employment factors, must be considered in continued research and advocacy efforts. Community programs may be initiated to provide lower-cost OBGYN services that are able to accommodate domestic workers' typical work schedules. Additional efforts may expand the infrastructure of free HIV testing in Macao and campaign to increase public acceptability and awareness of the importance of widespread testing. Future research may identify subgroups of domestic workers at varied or heightened risk of poor SRH or low service utilization as to tailor policy recommendations to better address their specific needs.

## Contributorship statement

Yi: Formal analysis, Writing-Original Draft. Hall: Conceptualization, Methodology, Resources, Supervision, Project Administration, Funding. Acquisition, Writing – Review & Editing. Manio, Liu, Latkin, and all authors: Writing – Review & Editing.

## Declaration of Competing Interest

The authors declare no conflict of interest

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