 doi:10.20944/preprints202203.0372.v1

Article

Stigmatizing Attitudes Toward People Living with HIV among Young Women Migrant Workers in Vietnam

Toan Ha [1*], David Givens [1], Trang Nguyen [2] and Nam Nguyen [2]

[1] Department of Infectious Diseases and Virology, School of Public Health, University of Pittsburgh, Pittsburgh, Pennsylvania, USA;
[2] Institute of Social and Medical Studies, Hanoi, Vietnam
* Correspondence: toan.ha@pitt.edu

Abstract: Despite intensive HIV education and prevention efforts in the past years, stigmatizing attitudes toward people living with HIV (PLWH) remain a major barrier to HIV prevention and treatment efforts in Vietnam. The purpose of this study was to examine the prevalence of stigmatizing attitudes regarding HIV and identifying correlative factors that impact perceptions of PLWH among women migrant workers working in the industrial zones (IZ) in Hanoi, Vietnam. A cross-sectional study was conducted among 1061 women migrant workers aged 18 to 29 from January to November 2020 in Hanoi, Vietnam. Stigmatizing attitudes toward PLWH were measured using a four-item scale. Multiple logistic regression was conducted to examine factors associated with stigmatizing attitudes. Over seventy-six (76.2 %) of the participants reported having at least one of the four stigmatizing attitudes. Greater levels of stigmatizing attitudes toward PLH were significantly associated with lower HIV knowledge, lower education and being Kinh (the ethnic majority in Vietnam). A high level of stigmatizing attitudes toward PWH among the study participants suggests that there is an urgent need for the development of appropriate culturally interventions and outreach education activities to reduce stigmatizing attitudes toward PWH among women migrant workers working in the IZs in Vietnam.

Keywords: HIV; stigmatizing attitudes; women migrant workers; industrial zones; Vietnam

1. Introduction

Social stigma can be understood as a process in which classes or groups of people are negatively stereotyped and labelled as socially undesirable by others with greater power and influence [1]. One particularly powerful form of stigma stems from a society's associations around specific diseases. In the case of Human Immunodeficiency Virus (HIV), HIV-related stigmas impede every step along the HIV continuum of care: uptake of HIV testing/diagnosis, linkage and engagement in care, medication adherence, and HIV suppression or reengagement for those lost to care [2, 3]. While a growing number of studies are addressing HIV-related stigma in other lower- and middle-income countries (LMICs) [4, 5, 6], only a few have been conducted among general population in Vietnam. Vietnam experiences significant HIV burdens, and HIV transmission and access to the care continuum remain major public health concerns in the country. Today, there are an estimated 250,000 people living with HIV (PLWH) in Vietnam, including disproportionate burdens among key populations that include sex workers, men who have sex with men (MSM), and intravenous drug users [7]. The fact that HIV in Vietnam remains highly stigmatized complicates efforts to prevent HIV transmission and engage at-risk communities. Indeed, intersecting identities can create compounding layers of stigma within key populations impacted by HIV (i.e., sexual orientation, gender identity, sex work, and illicit drug use) that reify barriers to HIV testing and treatment in Vietnam [8,9,10]. Stigma-driven barriers not only harm individuals and communities, but also threaten to keep Vietnam from achieving the Joint United Nations Program on HIV/AIDS (UNAIDS)'s target of zero new AIDS cases by 2030 [11].

Perceptions of stigma are informed by cultural expectations [12], and experiences thereof may vary considerably from culture to culture (e.g., in collectivist rather than individualist cultures) [13]. Studies examining the relationships between culture and HIV-related stigma document that PLWH in collectivistic societies are more likely to experience stigma than those in individualistic societies [14]. This may well be the case in Vietnamese collectivist culture as well. Yoshioka & Schustack (2001) described the tendencies for some southeast Asian collectivist cultures to define and enforce social expectations against "immoral" or "deviant" behaviors, including through the use of social myths about risks and social consequences [15].The perpetuation of these social narratives is a key social mechanism that perpetuates HIV-related stigmatization [15].

During early efforts to raise awareness of HIV prevention in Vietnam, HIV was often portrayed through negative and frightening images and posters. Posters that proclaimed "HIV equals death," for example, were specifically designed scare people into adopting desired avoidance behaviors [16,17]. Negative associations with HIV were further compounded by its association with injection drug users and sex workers, who were already stigmatized in much of Vietnamese society as "social evils" [18]. This approach to early public health HIV campaigns has had serious and long-term consequences. In the eyes of many in Vietnamese society today, PLWH often are still often assumed to have engaged in culturally stigmatized "immoral" behaviors, with the further implication being that they "deserve" their HIV diagnosis [18]. Vietnam has worked in recent years to reduce HIV-related stigma toward PLWH, including through the implementation of a rights-based approach to HIV prevention [19]. Vietnam was also the first Southeast Asian country to commit to achieving the 90-90-90 global HIV targets by 2020 [20]. Despite these efforts, recent studies show that stigma toward PLWH still remains prevalent in Vietnam [10,21]. PLWH continue to report experiencing stigmatization due to internalized shame, negative social perceptions and judgements, and discrimination at both the community and family level [22]. Specifically, PLWH in Vietnam still often experience interpersonal social avoidance, perceived anger, and social rejection [23], and report having experienced stigma and discrimination in healthcare settings, ART clinics [8,9] and in family and community settings [21].

Since Vietnam carried out an "open door" economic policy in 1986, its adoption of a liberalized economic model has generated rapid industrialization of the country's major cities. The country has attracted a large number of foreign investors to open business and factories in what are referred to as industrial zones (IZ) that support electronics, textiles, footwear, and automobile parts industries. To meet this labor demand, hundreds of thousands of women migrate from rural communities to cities in Vietnam to work in these IZs. Vietnam currently has 257 operational IZs and approximately 3.6 million workers; a majority of these workers identify as women [23]. These migrant workers predominantly come from low income, patriarchal families where they have typically had limited formal education, opportunities, and mobility [24,25]. Beyond these basic demographic characteristics, however, significant knowledge gaps persist in understanding these workers' adaptations to and perceptions of their lives away from their families.

One of the numerous challenges that many women face in the IZs revolve around sexual and reproductive health (SRH) and HIV. In Vietnam, SRH services mainly target married couples, and consequently unmarried women have limited access to SRH services [26,27]. While a large number of unmarried women migrant workers labor in IZs, there are currently no official government programs providing SRH services for them [27]. Due to the ho khau system policy [28, 29], migrant women workers can only access public subsidized SRH/HIV services in their rural communities of origin. This means that women who have migrated to find work can only access healthcare services if they have the financial means to pay for health services in the city [26]. Consequently, the vast majority of IZ women workers only seek health care and SRH/HIV services for extreme need. Limited studies in Vietnam suggest that IZ migrant women workers are generally less formally educated than male migrant workers, lack access to SRH related information,

 doi:10.20944/preprints202203.0372.v1

and are often at risk for domestic violence, non-consensual and/or unsafe sex, and sex work [26, 30] . While a recent study among IZ migrant workers reported lack of accurate knowledge about HIV and STIs [31], there are no studies that specifically investigate the prevalence of stigmatizing attitudes and behaviors toward PLWH among this population in Vietnam.

The purpose of this study is to address this knowledge gap through quantifying the prevalence of stigmatizing attitudes regarding HIV and identifying correlative views that impact perceptions of PLWH among women migrant workers working in the industrial zones in Hanoi, Vietnam. Given the known limitations around access to HIV prevention services in the IZ, we hypothesized that a majority of young women migrant workers would hold stigmatizing attitudes toward PLWH. We further hypothesized that young women migrant workers who did access SRH/HIV services while living in the IZ would be more likely to express less stigmatizing attitudes toward PLWH than those who have not used such services.

2. Materials and Methods

Study Site and participants

A cross-sectional study was conducted among 1061 young migrant women from January 2019 to November 2020 in Thang Long Industrial Park on the outskirts of Hanoi, the capital of Vietnam. The Park currently has 31 major industries, focusing on assembly of consumer goods, electronic components, vehicle accessories, automotive electronics, and civil mechanical appliances [32] . The majority of the young women workers live in "rent clusters" which are privately owned and developed by landlords to accommodate the flow of workers seeking residences in the surrounding areas of the Park. A minority of workers, particularly those who are just beginning their work in the IZ, live in dormitories provided by their factories.

Eligibility criteria for participation in the study involved self-identifying as: (1) a woman; (2) being between 18 and 29 years of age; (3) either single, currently married but not living with a husband or partner while working in the IZ, separated, divorced, or widowed; (4) having worked in the IZ for six or more months; (5) from a rural area or another province prior to IZ employment. The study was approved by the University of Connecticut Health Center Institutional Review Board and the Institute for Social and Medical Studies, Vietnam. Written informed consent in Vietnamese was obtained from all participants in the study.

Sample Size

Our study sample was made based on cluster sampling. Cluster sample designs that include people living/working in close proximity (such as women living together in a rent cluster or dormitory) can affect the power of a study due to the interactive effect of similar-behaving subjects. Our sample size determination accounted for the cluster design through intra-class correlation (ICC) within the primary sampling unit: rent clusters and dormitories. We accounted for ICC by basing power on the effective sample size [33]. Our sampling approach involved collecting data from 419 rent clusters and two dormitories for a total of 1,061 respondents.

Sampling process

A multistage clustered sampling method was used to enroll women workers. First, 779 rent clusters and two dormitories located near the IZ were mapped and enumerated. For rent clusters, only rent clusters with six or more eligible participants were selected, resulting in the exclusion of 360 rent clusters and leaving 419 qualifying rent clusters. A total of 936 participants were randomly selected from these 419 rent clusters. For the two qualifying dormitories, 125 participants were randomly selected based on the list of 175

 doi:10.20944/preprints202203.0372.v1

eligible participants provided by the dormitory managers. In total, 1061 young women workers met the eligibility criteria to be interviewed.

Survey interview

Eligible participants were invited to an after-hours meeting in a nearby commune health center organized by the research team. At the meeting, they were fully informed about the study and the interviews in which they were expected to participate. If they agreed to participate in the study, they were asked to sign written informed consent before receiving a face-to-face anonymous interview using closed-ended questions conducted by trained field researchers. All interviewers received training in interviewing techniques, developing rapport, ensuring confidentiality, and answering questions raised by participants.

Measurement

Socio-demographic variables

Recorded socio-demographic variables include age, marital status, education, ethnicity, length of employment working at the IZ, housing status, working hours, and income.

Stigmatizing stigma

To assess stigmatizing attitudes toward PLWH, four items were used to capture negative perceptions. These questions were: (1) "If a member of your family got infected with HIV, would you want to try to keep it secret?"; (2) "If a family member/relative of yours became sick with AIDS, would you be willing to care for him/her in your own household?"; (3) "If a worker was infected with HIV/AIDS, should he/she be allowed to continue working?"; and (4) "Would you buy food from a shopkeeper who was infected HIV/AIDS?" The closed response choices were "Yes," "No," and "Do not know." Each question response was coded so that a non-zero value indicated a discriminatory attitude for all questions. Participants with an affirmative response to question one or negative responses to questions two through four were coded as stigmatizing attitudes toward PLWH. The final composite score of stigmatizing attitudes ranged from 0-4 with higher score indicating higher levels of stigmatizing attitudes toward PLWH.

HIV/AIDS knowledge

Knowledge of HIV/AIDS was measured with 7 yes/no/don't know questions. Participants were asked a series of questions including one item on HIV transmission ("HIV can be transmitted via unprotected sexual intercourse"), three items on the prevention of HIV (e.g., "people can protect themselves from HIV infection by using a condom correctly every time they have sex") and three items about common HIV misconceptions. These last questions included statements about transmission via mosquito bites, transmission via sharing food with an individual living with HIV, and whether or not a healthy-looking person can have HIV/AIDS. Each correct answer was given one point, with a total score ranging from 0 to 7 points. A higher score indicated greater HIV knowledge.

Utilization of SRH/HIV services

Participants were asked if they had used sexual and reproductive health (SRH) or HIV services since they had begun working in the IZ. If yes, they were then asked to respond yes or no to each item on a standardized list of SRH and HIV services (e.g. HIV test, pregnancy care and/or delivery, gynecological exam, etc.).

Data analysis

Univariate analysis was conducted to obtain descriptive statistics of all variables. Frequencies and percentages were computed for categorical variables and as means for continuous variables. Chi- square was used to examine the associations between stigmatizing

 doi:10.20944/preprints202203.0372.v1

attitudes and socio-demographic characteristics. Multiple logistic regression analysis was used to examine factors associated with stigmatizing attitudes controlling for demographic factors (age, education, marital status, ethnicity, and place of residence). A p-value was considered significant at < 0.05.

3. Results

Socio-demographic characteristics

A total of 1061 young women workers were recruited and interviewed. The mean age was 22.8 years (ranging: 28 to 29, standard deviation=2.8) (Table 1). The majority of respondents (79.4%) had completed high school. Over two thirds of the respondents (n=760) were single/unmarried (71.6%). Mean income was US $294 per month, ranging from $195 to $652.

Table 1. Participant Characteristics.

Characteristics	Total (n=1061)	
	n	% or mean (SD)
Age (years)	1061	22.8 (3.3)
18-24	733	69.1
25-29	328	30.9
Education		
≤ Secondary	109	10.3
High school	842	79.4
Vocational school/ College or higher	110	10.4
Ethnicity		
Kinh (the majority)	735	69.3
Other minority groups	326	30.7
Marital status		
Unmarried	760	71.6
Married*	301	28.4
Residence		
Dormitory	125	11.8
Rent cluster	936	88.2
Years of working at the current IZ		
>=1 year	287	27.1
>1-5 years	625	58.9
>5 years	149	14.0
Daily shift working hours		
>=8 hours a day	810	76.3
Over 8 hours	251	23.7
Monthly Income		
mean	1,061	USD294.0
min		USD195.0
max		USD 652.2

*Married including those who were married and not living with their husbands and those who are separated, divorced or widowed.

Stigmatizing attitudes toward PLWH

Over seventy-six (76.2 %) of the respondents reported having at least one of the four stigmatizing attitudes. Considering each item individually, the most prevalent stigmatizing attitude was a negative response to "I am willing to buy foods from a shopkeeper with HIV/AIDS" (53.5%), followed by 47.4% of participants disagreeing with the statement that "a worker with HIV should be allowed to continue working". Conversely, 27.2% reported that they "would try to keep it secret if a member of your family got infected with HIV" and only 8.3% of respondents indicated that they would not be willing to care for a relative with HIV/AIDS at home.

 doi:10.20944/preprints202203.0372.v1

Table 2. Stigmatizing attitudes toward PLH among women migrant workers (n= 1061).

Stigmatizing Attitudes	*n* (%)
If a member of your family got infected with HIV, would you want to try to keep it secret? (agreed)	288 (27.2)
If a member/relative of yours became sick with AIDS, would you be willing to care for him/her in your own household? (disagreed)	88 (8.3)
If a worker was infected with HIV/AIDS, should he/she be allowed to continue working? (disagreed)	502 (47.3)
Would you buy food from a shopkeeper who was infected HIV/AIDS? (disagreed)	567 (53.5)
Had at least one stigmatizing attitude	*809 (76.2)*

Socio-demographic factors and stigmatizing attitudes toward PLWH

Table 3 presents the results of socio-demographic characteristics of the participants in relation to stigmatizing attitudes. Participants with less than a high school education reported higher levels of stigmatizing attitudes than participants who completed high school and above (p = 0.035). Participants who belonged to Kinh (the ethnic majority in Vietnam) were more likely to report having stigmatizing attitudes than those who belonged to ethnic minority groups (p = 0.015).

Table 3. Stigmatizing attitudes by demographic characteristics.

	Stigmatizing attitudes*		
	n	percent	p value
Age			
18-24	530	75.8	0.354
25 -29	279	77.1	
Education			
≤ Secondary school	94	86.2	
High school	632	75.1	0.035
Vocational school/ College or higher	83	75.5	
Marriage			
Unmarried	583	76.7	
Married	226	75.1	0.576
Ethnicity			
Other minority	233	71.5	
Kinh (the majority)	576	78.4	0.015
Residence			
Dormitory	94	75.4	0.768
Rent cluster	715	76.4	
Monthly income			
Low	471	77.6	0.234
High	338	74.4	
Used the SRH/HIV service while living in the IZ			
No	536	77.3	0.141
Yes	273	74.2	
Ever taken an HIV test			
No	675	77.1	0.084
Yes	134	72.0	

* Stigmatizing attitude was dichotomized into "having stigmatizing attitude" (those who endorsed to at least one of four questions) and "having no stigmatizing attitude" (those who did not endorse stigmatizing attitude to any question)

 doi:10.20944/preprints202203.0372.v1

Multiple stepwise regression analysis

Table 4 presents the multiple logistic regression analysis results. The results document that those with lower HIV knowledge were more likely to express greater stigmatizing attitudes toward PLH (p<0.001). Education level was also moderately correlated with stigmatizing attitudes (p<.01). Contrary to our secondary hypothesis, no statistically significant differences were found among participants who had ever used SRH/HIV services and who did not.

Table 4. Factors associated with stigmatizing attitudes toward PLWH among women migrant workers.

Characteristics	aOR	95% CI	p
Age			
18-24	1		
25-29	1.40	0.96-2.05	0.076
Education			
< High school	1		
High school and higher	0.44	0.24-0.80	**0.007**
Marital status			
Single	1		
Ever married	0.85	0.55-1.29	0.454
Ethnicity			
Other minority group	1		
Kinh (the majority) group	1.39	1.02-1.89	**0.036**
Residence type			
Dormitory	1		
Rent cluster	1.08	0.68-1.71	0.730
Knowledge of HIV/AIDS	0.69	0.60-0.80	**<0.001**
Used the SRH/HIV[a] service while living in the IZ			
No	1		
Yes	0.85	0.60-1.21	0.375
Ever taken an HIV test?			
No	1		
Yes	0.83	0.57-1.21	0.228

Note: [a]SRH/HIV: Sexual and Reproductive Health/HIV. aOR: adjusted Odd Ratio

4. Discussion

This is the first known study to directly examine the prevalence of stigma toward PWH among women migrant workers working in the industrial zones in Vietnam. In keeping with our hypothesis, the study responses demonstrated a high proportion of women migrant workers have at least some stigmatizing attitudes toward PLWH; over seventy-six percent (76.2%) of respondents reported having at least one of the four measures of stigmatizing attitudes. This study supported our hypothesis that stigmatizing attitudes toward PLWH in Vietnam remain prevalent. These results are consistent with similar findings about stigmatizing attitudes toward PLWH among migrant workers in China [34,35] and Nepal [36] . It is also in line with findings from a 2008 study by Hong et al that found that rural-to-urban migrant workers in China possessed high measures of stigmatizing attitudes toward PLWH [38]. A number of possible factors may explain these high levels of stigmatizing attitudes toward PLWH among study participants. First, the majority of these migrant workers were from rural areas with limited access to education and HIV specific educational programs. Indeed, education appeared to be a dominant predictive factor in our study. Participants with lower levels of HIV knowledge were more likely to respond with a higher measure of stigmatizing attitudes toward PLWH. Further,

 doi:10.20944/preprints202203.0372.v1

those respondents with lower overall education levels were more likely to express higher rates of stigmatizing attitudes toward PLWH than those with high school education and above. This correlational data with education generally and HIV knowledge specifically, then, seems to influence respondents' perceptions of HIV, interacting with the backdrop of existing historically and culturally based stigmatizing attitudes toward PLWH that are known to be prevalent in the rural provinces [38]. Put a different way, higher scores in these two categories may be acting to mitigate culturally informed stigmatized perceptions of PLWH.

Secondly, while living in the IZ, these migrants seem to have limited access to HIV education programs and prevention services. A 2012 study among IZ women migrant workers in Vietnam reported that only 21.6% of participants ever sought treatment from healthcare services when they suffered from reproductive tract infections [39]. A further barrier is that in Vietnam migrant workers are not considered permanent residents in the city. As a result, they are not categorized as official target demographics for HIV education activities conducted by the government public health agencies [26]. These factors contribute to what we've documented here, which is highly limited access to HIV information. This finding suggests that addressing stigmatizing attitudes toward PLWH and improving access to HIV education programs among this population will require both local and national government agencies to develop policies and programs specifically targeting migrant workers. Such policy interventions would ensure that they have equitable access to healthcare and SRH/HIV services as local residents.

This study's finding that participants with lower HIV knowledge were more likely to report greater levels of stigmatizing attitudes toward PWH echoes similar findings reported among migrant workers in China [35] and other populations in both China [40] and Laos [41]. In summarizing lessons learned from those research programs, Pulerwitz et al (2010) reported that providing participants with accurate knowledge about HIV transmission can result in less fear and avoidance attitudes toward PLWH [42]. This previous comparable work, combined with our findings here, suggest that improving HIV knowledge among migrant workers in IZ settings may also help reduce stigmatizing attitudes toward PLWH.

A noteworthy finding from this study is that women migrant workers who had used SRH/HIV while living in the IZ did not demonstrate less stigmatized attitudes towards PLWH in a statistically significant way. This disproves our hypothesis that accessing such services would mitigate stigmatizing attitudes. Our survey hypothesized that those who accessed these services might receive HIV-related counseling and/or HIV education, which would decrease fear of HIV and stigmatized attitudes toward PLWH. However, the study results did not find any significant differences between participants who had accessed SRH/HIV services and those who had not. One explanation for this important finding could be that those services did not, in fact, dispense counselling or education related to HIV. This result thus highlights an important potential healthcare gap, opportunity for targeted interventions, and a topic where further research is needed to more fully explore this issue.

Despite intensive HIV education and prevention efforts at the community level [10] as well as the incorporation of HIV education into school settings across Vietnam in the past two decades [19], our research shows that stigma toward PLWH remains high. A high level of stigmatizing attitudes among this study population suggests that additional outreach activities and appropriate culturally interventions are needed to address stigmatizing attitudes toward PLWH among IZ women migrant workers. Interventions using mHealth- characterized as the use of mobile technologies for health to improve access to health information and health service delivery may be an effective approach to reduce stigmatizing attitudes toward PLWH among this population. This approach has been shown to be effective in increasing IZ women migrant workers' SRH knowledge in Vietnam [43], young people's access to SRH services in LMICs [44], and in reducing HIV-related stigma among youth in the US [45].

 doi:10.20944/preprints202203.0372.v1

Finally, it is worth noting that the most stigmatized responses reference people outside of the respondent's family. Nearly 92% of the participants indicated that they would be willing to care for a family member who became HIV positive. Traditional Vietnamese family values are deeply affected by Confucianism, which teaches that taking care of family members when they are sick is very important [47]. In this traditional cultural view, women in particular are expected to stand by and support their husbands through illness [16]. Indeed, Khuat (2004) documented similar findings, noting that mothers and wives would try to find ways to make their sons/husbands feel comfortable when ill, including if they got sick because of HIV [18]. Our finding that the vast majority of respondents expressly stated their willingness to care for a family member who has HIV/AIDS has profound potential to influence further stigma reduction efforts. Leveraging narratives of, and culturally appropriate messaging around, the importance of family may be a novel narrative entry point for interventions and/or campaigns that seek to dismantle HIV-related stigma. In this way, the role of family members should remain crucial not only in the care of PLWH in Vietnam, but may also significantly contribute to future stigma reduction efforts as well.

Limitations

There are several limitations in this study. Given the nature of this cross-sectional design, our findings should not be interpreted beyond associations, and causality cannot be definitively demonstrated. Stigmatizing attitudes were measured using only four questions and do not comprehensively measure every domain of stigma and intersectional stigma. Generalizations of these findings cannot be made to other migrant populations. Further, while the Thang Long Industrial Park is demographically similar to many of the IZs around Hanoi, it cannot be assumed that the Thang Long Industrial Park and its workers are necessarily representative of all IZs in Vietnam. Finally, this study focused on recruiting women migrant workers, and so any stigmatizing attitudes toward PLWH among men migrant workers, as well as perceptions among transgender individuals in Vietnam, may be different. In this regard, it is worth noting that gender identity is treated as a self-reported identifier throughout this study. Gender does not exist in a binary, and this study intentionally uses the broad and non-biologically deterministic term 'women' throughout to include all participants who identify as women regardless of their sex assigned at birth. Researching stigma and other experiences among transwomen and all gender expressions throughout Vietnamese communities is beyond the scope of this study but would be a fruitful and important avenue for future research.

5. Conclusions

A persistence of high level of stigmatizing attitudes toward PWH among migrant workers is clearly a widespread issue among women migrant workers in the IZ in Vietnam. This study provides novel data supporting the prioritization of HIV intervention programs generally and the need for stigma reduction efforts toward PLWH specifically among migrant workers working in the IZ in Vietnam. Additionally, it provides critical evidence and suggestions for policymakers and healthcare leaders regarding improvements to conditions and policies around SHR and HIV, as well as the need to improve access to HIV prevention and treatment services among migrant workers working in IZs in Vietnam.

Author Contributions: Conceptualization, T.H, N.N, methodology, T.H, N.N, T.N, investigation, N.N, T.N, TH, project administration, N.N, T.N, formal analysis, T.H, T.N, D.G, T.N, supervision, T.H, writing-original draft preparation, T.H, writing– review & editing, T.H, D.G.

Funding: This research was funded by the National Institutes of Health, USA, grant # R21MH118986

Institutional Review Board Statement: The study was approved by the University of Connecticut Health Center Institutional Review Board and the Institute for Social and Medical Studies, Vietnam. Written informed consent in Vietnamese was obtained from all participants in the study.

Informed Consent Statement: Informed consent was obtained from all participants involved in the study

Acknowledgments: The authors are grateful to women migrant workers who agreed to participate in this study.

Conflicts of Interest: All authors declared no conflicts of interest

References

[1] Erving Goffman, "Chapter stigma and social identity" in *Deviance & Liberty*, Lee Rainwater, Ed. Routledge, 2018, pp. 24-31.
[2] Chambers, L.A; Rueda, S.; Baker, D.N.; Wilson, M.G.; Deutsch, R.; Raeifar, E.; Rourke, S.B. "Stigma, HIV and health: a qualitative synthesis," *BMC Public Health* **2015**, *15*, 848.
[3] Katz, I. T.; Ryu, A. E.; Onuegbu, A. G.; Psaros, C.; Weiser, S. D.; Bangsberg, D. R.; Tsai, A. C. Impact of HIV-related stigma on treatment adherence: systematic review and meta-synthesis. *J Int AIDS Soc* **2013**, *16*, 18640.
[4] Gesesew, H.A.; Tesfay Gebremedhin, A.; Demissie, T.D.; Kerie, M.W.; Sudhakar, M.; Mwanri, L. "Significant association between perceived HIV related stigma and late presentation for HIV/AIDS care in low and middle-income countries: A systematic review and meta-analysis," *Plos One* **2017**, *12*, e0173928.
[5] Thapa, S.; Hannes, K.; Cargo, M.; Buve, A.; Peters, S.; Dauphin, S.; Mathei, C. Stigma reduction in relation to HIV test uptake in low- and middle-income countries: a realist review. *BMC Public Health* **2018**, *18*, 1277.
[6] Smith, M.K.; Xu, R.H.; Hunt, S.L.; Wei, C.; Tucker, J.D.; Tang, W.; Luo, D.; Xue, H.; Wang, C.; Yang, L.; Yang, B.; Li, L.; Joyner, B.L Jr.; Sylvia, S.Y. "Combating HIV stigma in low- and middle-income healthcare settings: a scoping review," *J Int AIDS Soc* ***2020***, *23*, e25553.
[7] UNAIDS. *Country factsheets VIET NAM-2020: HIV and AIDS Estimates*. https://www.unaids.org/en/regionscountries/countries/vietnam. (accessed 02/22, 2022).
[8] Ha, P. N.; Chuc, N. T. K.; Hien, H. T.; Larsson, M.; Pharris, A. HIV-related stigma: Impact on healthcare workers in Vietnam. *Glob Public Health* **2013**, *8*, 61.
[9] Tran, B. X.; Than, P. Q. T.; Tran, T. T.; Nguyen, C. T.; Latkin, C. A. Changing Sources of Stigma against Patients with HIV/AIDS in the Rapid Expansion of Antiretroviral Treatment Services in Vietnam. *Biomed Res Int* **2019**, 4208638.
[10] Do, M.; Ho, H. T.; Dinh, H. T.; Le, H. H.; Truong, T. Q.; Dang, T. V.; Nguyen, D. D.; Andrinopoulos, K. Intersecting Stigmas among HIV-Positive People Who Inject Drugs in Vietnam. *Health Services Insights* **2021**, *14*, 11786329211013552.
[11] UNAIDS. *Fast-Tract -Ending the AIDS epidemic by 2030*. https://www.unaids.org/en/resources/documents/2014/JC2686_WAD2014report (accessed 02/28, 2022).
[12] Heatherton, T. F. *The Social Psychology of Stigma;* The Guilford Press: New York, NY., 2003.
[13] Murthy, R. S. Stigma is universal but experiences are local. *World Psychiatry* **2002**, *1*, 28.
[14] Liamputtong, P. *Stigma, discrimination and living with HIV/AIDS: A cross-cultural perspective;* Springer Science + Business Media: New York, NY, US, 2013; pp 1–19.
[15] Yoshioka, M. R., Schustack, A. Disclosure of HIV status: Cultural issues of Asian patients. *AIDS Patient Care STDS* **2001**, *15*, 77-82.
[16] UNESCO. Vietnamese cultural approach to HIV/AIDS prevention, support and care: in selected areas of Ho Chi Minh city, and Quang Ninh province. https://unesdoc.unesco.org/ark:/48223/pf0000130524 (accessed 02/21, 2022).
[17] Smoot, C. "“Edutainment”: The Role of Mass Media in the Development of an Effective HIV/AIDS Youth Awareness Campaign in Viet Nam," *Independent Study Project (ISP) Collection*, **2009**, 795.
[18] Khuat, T. H., Nguyen, T. V. A., Ogden, J. Understanding HIV and AIDS-related stigma and discrimination in Vietnam. *International Center for Research on Women*, 2004. https://www.icrw.org/publications/understanding-hiv-and-aids-related-stigma-and-discrimination-in-vietnam (accessed 02/11, 2022).
[19] Nguyen, H.P.; Pharris, A.; Huong, N.T.; Chuc, N.T.; Brugha, R.; Thorson, A. The evolution of HIV policy in Vietnam: from punitive control measures to a more rights-based approach," *Glob Health Action* **2010**, *3*.
[20] UNAIDS., "Viet Nam is key partner at high-level meeting on ending AIDS." https://unaids.org.vn/viet-nam-key-partner-high-level-meeting-ending-aids (accessed 02/10, 2022).
[21] Than, P.Q.T., Tran, B.X., Nguyen, C.T. et al. Stigma against patients with HIV/AIDS in the rapid expansion of antiretroviral treatment in large drug injection-driven HIV epidemics of Vietnam. *Harm Reduct J* **2019**, *16*.
[22] Gaudine, A.; Gien, L.; Thuan, T.T.; Dungdo, V. Perspectives of HIV-related stigma in a community in Vietnam: a qualitative study. *Int J Nurs Stud* **2010**, 47, 38-48.

[23] Stimson Vietnam Country Profile: An overview of policy and trends on energy, transportation, water, and industrial infrastructure in Vietnam. https://www.stimson.org/2021/vietnam-country-profile/ (accessed 02/20, 2022).
[24] Bowen, R. From Fields to Factories: Prospects of Young Migrant Women in Vietnam's Garment and Footwear Industry, RMIT, 2008.
[25] Bélanger, D.; Pendakis, K. Vietnamese Daughters in Transition: Factory Work and Family Relations. *The Asia-Pacific Journal: Japan Focus* **2010**, *2*, 1-8.
[26] UNFPA Social-culture influences on the reproductive health of migrant women: a review of literature in Vietnam. https://www.unfpa.org/sites/default/files/pub-pdf/Migrant_Vietnam_.pdf (accessed April, 2021).
[27] Pham, V.; Nguyen, H.; Tho, L. H.; Minh, T. T.; Lerdboon, P.; Riel, R.; Green, M. S.; Kaljee, L. M. Evaluation of Three Adolescent Sexual Health Programs in Ha Noi and Khanh Hoa Province, Vietnam. *AIDS Res Treat* **2012**, 986978.
[28] Taylor, P. *Social Inequality in Vietnam and the Challenges to Reform;* ISEAS–Yusof Ishak Institute: Singapore, 2004.
[29] Siu, K.; Unger, J. Work and Family Life among Migrant Factory Workers in China and Vietnam. *Journal of Contemporary Asia* **2020**, *50*, 341-360.
[30] Tran, B. X.; Vo, T.; Dang, A. K.; Nguyen, Q. N.; Vu, G. T.; Vu, L. G.; Do, K. N.; Latkin, C. A.; Ho, C.; Ho, R. Characterizing Unsafe Sexual Behavior among Factory Workers in the Context of Rapid Industrialization in Northern Vietnam. *International Journal of Environmental Research and Public Health* **2019**, *16*, 5085.
[31] Nguyen, D. N.; Vu, H. M.; Nguyen, Q. N.; Nguyen, C. T.; Do, H. T.; Vu, T. M. T.; Tran, B. X.; Latkin, C. A.; Ho, C. S. H.; Ho, R. C. M. Gaps of Knowledge about HIV and Sexually Transmitted Infections Among Industrial Workers in Northern Vietnam. *AIDS Behav* **2022**, *26*, 188-195.
[32] Home ID. *Thang Long Industrial Zone- Dong Anh District - Hanoi*. http://homeid.com.vn/en/industrial-zone/thang-long-industrial-zone.html (accessed 01/21/2022).
[33] Killip S, Mahfound Z, Pearce K. What is an intra-cluster correlation coefficient? Crucial concepts for primary care researchers. *Ann Fam Med* **2004**, 2, 204–208
[34] Liu, H.; Li, X.; Stanton, B.; Fang, X.; Mao, R.; Chen, X.; Yang, H. Relation of sexual risks and prevention practices with individuals' stigmatising beliefs towards HIV infected individuals: an exploratory study. *Sex Transm Infect* **2005**, *81*, 511-516
[35] Cao, H.; He, N.; Jiang, Q.; Yang, M.; Liu, Z.; Gao, M.; Ding, P.; Chen, L.; Detels, R. Stigma against HIV-infected persons among migrant women living in Shanghai, China. *AIDS Educ Prev* **2010**, *22*, 445-454.
[36] Dahal, S.; Pokharel, P. K.; Yadav, B. K. HIV/AIDS Related Stigma among Male Labor Migrants in Nepal. *World journal of AIDS* **2013**, *3*, 305-312.
[37] Hong, Y.; Li, X.; Stanton, B.; Fang, X.; Lin, D.; Wang, J.; Mao, R.; Yang, H. Expressions of HIV-Related Stigma among Rural-to-Urban Migrants in China. *AIDS patient care and STDs* **2008**, *22*, 823-831.
[38] Pharris, A.; Hoa, N.; Tishelman, C.; Marrone, G.; Chuc, N.; Brugha, R.; Thorson, A. Community patterns of stigma towards persons living with HIV: A population-based latent class analysis from rural Vietnam. *BMC public health* **2011**, *11*, 705
[39] Le, K. A.; Pham, L. T.; Vu, L. H.; Schelling, E. Health services for reproductive tract infections among female migrant workers in industrial zones in Ha Noi, Viet Nam: an in-depth assessment. *Reprod Health* **2012**, *9*.
[40] Chen, J.; Choe, M. K.; Chen, S.; Zhang, S. Community environment and HIV/AIDS-related stigma in China. *AIDS Educ Prev* **2005**, *17*, 1-11.
[41] Vorasane, S.; Jimba, M.; Kikuchi, K.; Yasuoka, J.; Nanishi, K.; Durham, J.; Sychareun, V. An investigation of stigmatizing attitudes towards people living with HIV/AIDS by doctors and nurses in Vientiane, Lao PDR. *BMC Health Serv Res* **2017**, *17*.
[42] Pulerwitz, J.; Michaelis, A.; Weiss, E.; Brown, L.; Mahendra, V. Reducing HIV-Related Stigma: Lessons Learned from Horizons Research and Programs. *Public health reports* **2010**, *125*, 272-281.
[43] Vu, L. T., Nguyen, N. T., Tran, H. T., & Muhajarine, N. (2016). mHealth information for migrants: an e-health intervention for internal migrants in Vietnam. *Reproductive health* **2016**, *13*, 55.
[44] Feroz, A.S.; Ali, N.A.; Khoja, A.; Asad, A.; Saleem, S. Using mobile phones to improve young people sexual and reproductive health in low and middle-income countries: a systematic review to identify barriers, facilitators, and range of mHealth solutions. *Reprod Health* **2021**,*18*,9.
[45] Mulawa, M.I.; Rosengren, A.L.; Amico, K.R.; Hightow-Weidman, L.B.; Muessig, K.E. mHealth to reduce HIV-related stigma among youth in the United States: a scoping review. *Mhealth* **2021**,*7*,35.
[46] Lundberg, P.C.; Doan, T.T.; Dinh, T.T.; Oach, N.K.; Le, P.H.Caregiving to persons living with HIV/AIDS: experiences of Vietnamese family members," *Journal of Clinical Nursing* **2016**, *25*, 788-798.