Understanding gendered challenges of noncommunicable diseases in the slums of India

Lumagbas, L.B.

2017

document version
Publisher's PDF, also known as Version of record

citation for published version (APA)
Lumagbas, L. B. (2017). *Understanding gendered challenges of noncommunicable diseases in the slums of India: Towards a perspective on communal care*. [PhD-Thesis - Research and graduation internal, Vrije Universiteit Amsterdam].

Chapter 4

Factors of non-adherence to treatment of chronic illnesses in the slums of Chennai

Abstract

Treatment non-adherence is a critical health concern that is strongly associated with treatment failure. In the context of continuing slum formation, limited resources, and the epidemic of non-communicable diseases (NCDs), the prevalence of treatment non-adherence is inadequately studied and addressed in low-middle-income countries like India.

Purpose: This study identifies the factors of treatment non-adherence in the slums of South India and explores the underlying reasons. It provides evidence to urge policy makers and stakeholders to address this pressing issue.

Patients and methods: We used mixed methods in the study. A total of 204 respondents (65% women with mean age of 47.4 years) answered our survey. We used logistic regression analyses. We conducted five focus-group discussions and four in-depth interviews. In the qualitative analyses, thematic identification was used. The results were further analysed to arrive at more comprehensive and holistic results.

Results: Lack of time for self-care, financial dependence of women and the elderly, and alcoholism were the observed themes affecting slum dwellers' treatment non-adherence. This was corroborated by our findings that slum dwellers who were homemakers (mostly female) were less likely to adhere to treatment (OR = 5.2; 95% CI: 1.9 -13.6) or if they were aged 50 years or older (OR = 3.4; 95% CI = 1.2 – 9.9). Likewise, alcohol consumption leads to treatment non-adherence (OR = .27; 95% CI = .07, .66). Conversely, physician's advice was associated with better adherence to treatment (OR = 2.898; 95% CI = 1.202, 6.990).

Conclusion: The homemaker's lack of time due to household chores and the financial dependence of both the elderly and homemakers offer new alternative explanations for treatment non-adherence. Likewise, our finding relating to the effect of alcoholism on treatment non-adherence presents an unreported role of alcoholism in slum communities. Conversely, physicians' positive role in minimising treatment non-adherence supports similar findings in India.

4.1   Introduction

Adherence to treatment is the extent of the alignment between patients' behaviour and actions and agreed treatment regimens (Sabaté, 2003). Treatment adherence has numerous positive benefit (Damen, Thuresson, Heeg, & Lothgren, 2008; Martínez, Prado-Aguilar, Rascón-Pacheco, & Valdivia-Martínez, 2008;Wild, 2012). It protects against complications (Osterberg & Blaschke, 2005) and health deterioration (Rich, Brandes, Mullan, & Hagger, 2015), promotes a better quality of life (Airoldi et al., 2010),and lowers mortality (Desai et al., 2014; Rasmussen, Chong, & Alter, 2007; Roe & Smith, 2008). Its socioeconomic advantages (Mennini et al., 2015) lead to the realisation of sustainable health (Sokol, McGuigan, Verbrugge, & Epstein, 2005). However, poor adherence is prevalent, and a critical barrier to treatment success (Sabaté, 2003; Simpson et al., 2006). Sabaté (2003) asserts that 50% of patients in developed countries do not adhere to their prescribed treatment, while in low- and middle-income countries (LMICs), a bleaker scenario can be expected (Wild, 2012). The poor health systems in LMICs (Beaglehole et al., 2011b), coupled with widening health inequities (Szwarcwald, Mota, Damacena, & Pereira, 2011)orld , economic burdens (Tripathi, 2015) and minimal information regarding the status of treatment adherence in LMICs (Scheerer, Nimeh, & Weinmann, 2016) are all significant factors bolstering this assumption. For instance, Yusuf et al. (2011) found that treatment adherence to secondary medication of cardiovascular diseases (CVD) patients in India ranges from 3.3% to 9.7%. This is a critical matter as CVD is the leading cause of death in India. Non-adherence to treatment, hence, is a health issue of global magnitude (Adane, Alene, Koye, & Zeleke, 2013;Yusuf et al., 2011).

Poor adherence to treatment is further affected by the nature of the disease (WHO, 2005). Non-communicable diseases (NCDs), the leading cause of mortality and morbidity in LMICs, are characterised by WHO as diseases with slow progression, irreversible disability, and continued dwindling quality of life (WHO, 2005a; Osterberg & Blaschke, 2005). To prevent further deterioration and a worsening of their condition, NCD patients are required to observe a complex medication regimen and change their lifestyle over an extended period. Compliance proves to be difficult for many reasons (e.g. treatment complexity, depression, distance from health facilities, finances) (Sabaté, 2003) but especially for NCD patients who are currently asymptomatic, or those who doubt the effectiveness of the medication (WHO, 2005a).

In this situation, as LMICs face the continuing rise of NCDs and unabated slum formation (Tripathi, 2015) treatment non-adherence can further debilitate their weak health infrastructures (Dunbar-Jacob & Mortimer-Stephens, 2001; Jansà et al., 2010; Beaglehole et al., 2011; Srinath Reddy, Shah, Varghese, & Ramadoss, 2005) as it compounds the challenges of improving health in poor populations (Sabaté, 2003).

India is an LMIC with a rising incidence of NCDs and continued slum formation. In 2014, 53% of deaths in India were due to NCDs. CVD accounted for 24%, COPD 11%, accidents 10%, cancer 2%, and other NCDs 10% (India, 2017). In 2008, it was estimated that 32.5% of the total Indian population is at risk of hypertension. Current studies on treatment non-adherence in India mostly deal with HIV/AIDS, mental disorders, and tuberculosis (TB) and are less focused on NCDs. From these studies, some critical determinants of treatment non-adherence in India have been identified. Sarna et al. (2008) concluded in a cross-sectional study of patients receiving ART that one of the primary causes of non-adherence to treatment of HIV patients is the high cost of the medication. In a cohort study of HIV patients in Chennai, Safren et al. (2005) noted that the cost of medications is one of the primary causes for a patient's non-adherence to treatment or of 'taking a drug holiday'. Joglekar et al. (2011) concluded in a qualitative study of barriers to ART adherence in Maharashtra that aside from self-perceived stigma, the doctor-patient relationship, less attention from counsellors, and quality of service are the major reasons for non-adherence. The role of clinics and institutions was emphasised by. Gore, Dhumale, Kumbhar, and Kadam, (2015) in their cross-sectional study of adherence to treatment by diabetic patients. Vijay et al. (2010) deduced in a cohort study that the critical information given by health providers influenced treatment non-adherence of DOTS patients. Similarly, Suresh et al. (2012) noted the crucial role of health institutions and health professionals in a cohort study of treatment adherence of schizophrenia patients. Several review articles underscored the complexity of treatment non-adherence (Osterberg & Blaschke, 2005; Katz et al., 2013). The diagnostic and treatment knowledge of health professionals has been cited in a prospective study as a decisive factor in the treatment non-adherence of patients with TB (Uplekar, Juvekar, Morankar, Rangan, & Nunn, 1998). In a cross-sectional survey of diabetic patients in a tertiary care hospital, Venkataraman et al. (2012) concluded that the education level of the patient and family support are decisive in the treatment management of diabetic patients. Walshe et al. (2010) observed that the differences in treatment perception between patients and doctors in their cross-sectional study of HIV-patients are an important factor for treatment non-adherence. The personal beliefs, attitudes, and individual propensities of patients have been established in several studies as a decisive factor in treatment non-adherence. Venkatesh et al. (2010) emphasised in a quantitative study of the predictors of non-adherence to treatment of HIV patients in South India that the patients' behaviour, specifically alcoholism and sexual activity (AOR 10.44; 95% CI: 2.61 – 41.63; p =.001), and their perception of their psychosocial status increase their risk for non-adherence. In another qualitative study of HIV patients in Chennai, Kumarasamy et al. (2005) observed that personal privacy, stigma, and social support influence the patient's non-adherence. Looking into the relationship between co-morbidities of chronic illnesses and mental health (Chopra, Misra, Gulati, & Gupta, 2013). Bhojani, Mishra, et al. (2013) noted the inverse relation of the patient's internal perception and the external support received vis-à-vis treatment adherence. In this regarfd, the nature of the disease determines the patients' non-adherence to treatment. The minimal focus on NCDs and their risk factors hinders the

understanding of its treatment adherence/non-adherence dynamics in the context of slum conditions.

Vermeire, Hearnshaw, Van Royen, & Denekens (2001) noted in their extensive literature review that the vagueness of treatment adherence as a concept worsens the empirical issues of treatment adherence and non-adherence. They noted that the fact that authors neglect to define treatment adherence and non-adherence is further complicated by the interchangeable use of similar terms but each with different parameters (e.g. treatment compliance, acceptance, persistence, and adherence). Hence, this vagueness is one of the major concerns encountered by studies dealing with treatment adherence and non-adherence.

In this regard, the urgency and persistence of the treatment non-adherence issue plus the limited literature on it underline the necessity of identifying factors that may lead patients not to adhere to treatment. Insights into the factors of treatment non-adherence are essential in the formulation and development of health policies and programmes directed towards the actual health concerns of slum dwellers. Then the dire effect of the inverse care law in the slums – the sickest patients receive the least care – might be mitigated, if not eliminated.

From these perspectives, our research aimed to identify the factors of treatment non-adherence of slum dwellers and provide evidence that may be used to develop more contextualised policies and programmes geared towards minimising treatment non-adherence in slum populations.

4.2   Material and methods

4.2.1   Design

We adopted an approach using mixed methods for this study. The decision to use mixed methods was motivated by the limited information available in the literature regarding the quantitative identification of non-adherence risk factors and their qualitative contextualization in the slums. We gathered a variety of quantitative and qualitative data (Creswell, 2013)that provided a more holistic perspective of the matter. The quantitative data were analysed to identify risk factors for non-adherence to treatment in the slums, while the qualitative data were used to investigate the nature of the relationships underlying the identified associations. Concurrent triangulation was used on the collected data (Creswell, 2013).

The study protocol received ethical approval from the institutional review board of The Balm Institute in Tamil Nadu, India. The data collection was started only after the community leaders were informed and gave their approval. The purpose of the research, the procedures of the

interviews, and the content of the survey questionnaires were all verbally explained to each of the participants. Instead of a written consent, verbal consent from the participants was obtained due to their low level of education. All interviewees were informed that they were free to end the interview at any time and not to answer questions if they felt uncomfortable. To maintain confidentiality, data gathering was executed at the place and time they indicated as convenient to them. No information on the identity of the participants was collected.

4.2.2 Quantitative data collection

Settings and participants

We performed a cross-sectional field study in some slum communities located in Tamil Nadu. The period for the survey ranged from 10 November 2014 to 20 February 2015. To enrol subjects and collect data in a pragmatic way, we approached all inhabitants of a particular street of the studied slum on a given day. All streets and their inhabitants were investigated successively. For security reasons data were collected during the daytime.

Eligibility criteria included i) living in the community for a minimum of a year, ii) being aged 18 years and older at the time of inclusion, iii) consenting to participate, and iv) having at least one on-going daily treatment or on-going daily prescription. The WHO STEPwise approach to surveillance (STEPS) questionnaire for NCDs and their risk factors was used (WHO, 2005b). Of the 604 respondents to the STEPS survey, a total of 204 qualified for the adherence treatment study because they had a daily prescription at the time of the data collection.

We prepared a standardised questionnaire to collect the medication data. For the medication data, we adapted the Morisky-Green questionnaire (Morisky, Green, & Levine, 1986). Changes in the questionnaire made it more suitable for both the Indian settings and participants. The language used (i.e. 'Are you careless in missing your medication?' was changed to 'What will make you miss taking the medicine?') and inclusion of community context were the changes made to the questionnaire (e.g. instead of only references to institutions, we added family, neighbours, friends). It was pilot-tested with 10 households. For the sociodemographic data and information regarding other health behaviours, the STEPS survey questionnaire was used without modification.

Outcome of interest

We defined treatment non-adherence as medication daily intake < 75% per month. This was supplemented by a question in our questionnaire in which the participants were directly asked

whether they fail to take their medication (yes/no) and if yes, how many days of treatment were missing per month. This was confirmed by an examination and count of the medication they had left. Those who declared they had missed taking a drug within this parameter were considered non-adherent to treatment.

Other variables studied

We collected information on factors related to the five dimensions proposed by WHO (Sabaté, 2003)

1. Treatment-related factors. Questions included: (a) number of medications they have to take and (b) how many times per month they were taking or failing to take their medication.
2. Sociodemographics. Poverty was explored by considering income per household (WHO, 2005b). Following the World Bank's poverty limit (A. K. Mehta & Bhide, 2010) , we defined poverty as household income lower than 85,000 Indian rupees (INR) per year (around US$ 1415 per year). In the STEPS survey, the other variables studied included age in years as reported at the time of enrolment, sex, marital status (single, married, and widowed), level of education (no formal education, less than or equal to high school, completed high school +), number of persons in their household, ethnicity (Tamil or other). Professional activity was documented by considering employment status (employed/unemployed/home-maker/self-employed) at the time of enrolment. Risk factors for NCDs were explored by considering tobacco use (user/former user/never used), physical activity (work, leisure, transport), sleeping/resting time, nutrition (oil used for cooking, vegetable and fruit intake), and frequency of alcohol intake [moderate drinker (<= 2 standard drinks), heavy drinker (3+ standard drinks)/never (0)].
3. Health care team and system-related factors. The questions were: (a) from whom do they get information about their medications and (b) where do they get their medicines?
4. Patient-related factors. Questions included: (a) how much do you spend for your medicines? (b) how far away is the place where you get your medication? (c) what will make you miss your medicines? and (d) what will make you stop taking your medicines?
5. Chronic condition-related factors. We relied on the self-reported conditions of the participants that we supplemented with the indications they reported for their treatment as identified from the prescriptions that they received from their health care providers.

Statistical analysis

Characteristics of adherent and non-adherent subjects were compared in univariate analyses using X^2 exact test for qualitative variables and Student's t-test for quantitative ones (or nonparametric Wilcoxon test when Student's t-test could not be used). A logistic regression was

performed to identify all variables independently associated with non-adherence to treatment; the dependent variable was non-adherence to treatment. Variables were included in the model if they were associated with non-adherence with a p-value ≤0.25 after univariate analysis. They were considered in the final model if they were associated with non-adherence with p<0.2 or found responsible for confounding or interacting with poverty. The association between treatment non-adherence and the factors age, work, alcoholism and physician's instructions was expressed using odds ratios (ORs) and 95% confidence intervals (95% CI). We used SPSS 21 (New York, USA) for the analyses. All reported p-values are two-tailed, with a significance level set at 0.05.

4.2.3 Qualitative data collection

Setting and participants

We held a total of five exploratory group interviews in the slum communities in April–May 2014 and November 2014–February 2015. Community leaders recommended possible participants for the interviews. Each participant's consent was first secured before the actual interviews were scheduled and conducted. Each group consisted of four to five participants with ages ranging from 18 to 55 years. One of the groups had only single participants, while the rest of them had a combination of married, widowed and never married women. This group was purposively selected to represent single young women living in the slums. Each session lasted for two to three hours. All interviews were audiotaped.

To circumvent the possible reluctance of patients in a group to talk about their personal experiences, we additionally conducted four in-depth interviews, with two men and two women. Two of them had been living in the community for more than 45 years, while the other two interviewees had been born in the community and had lived there for more than 25 years. The interviewees were selected for their willingness to share deeper insights regarding treatment in general and non-adherence to treatment in particular, their length of stay in the community, and their gender. They were interviewed separately and outside the community. Each interview lasted for one or two hours. All discussions and interviews were conducted in Tamil and English, with the bilingual assistant researcher translating.

Qualitative analysis of interviews

We transcribed the recorded in-depth and group interviews. Applying a grounded theory approach, we used open coding to cluster the statements of the informants to thematic labels. We adopted an iterative data analysis. The content analysis was open and oriented towards the

inductive analysis of themes. The process helped us to identify the common themes across the interviews. We stopped holding the interviews when saturation of data was reached. Member checking was used to establish confirmability or trustworthiness.

4.3   Results

All respondents (N = 204) were members of slum communities in Chennai, Tamil Nadu, India. Their sociodemographic characteristics are given in Table 1.

4.3.1   Results from multivariate logistic regression analysis

The multivariate logistic analysis showed that slum dwellers were less likely to adhere to treatment if they were homemakers (OR 5.1; 95%CI: 1.9 -13.6) and if they were aged 50 or over (OR 3.8; 95%CI: 1.3-11.0). Conversely, slum dwellers whose alcohol consumption was lower than the maximum recommended daily allowance were more likely to adhere to treatment (OR .21; 95%CI: .07; .66%). We found no significant relation between the number of family members, poverty, and treatment non-adherence. Finally, instructions provided by physicians were associated with a lower risk of non-adherence (OR 2.9; 95%CI: 1.2, 6.9).

Table 1 Socio-demographic characteristics of respondents

Characteristics		Frequency	%
Residence			
	Urban	204	100
Sex			
	Male	71	34.8
	Female	133	65.2
Age			
	18 - 33	29	14.2
	34 - 49	84	41.2
	50 +	91	44.6
Marital Status			
	Single	10	5.1
	Married	141	71.6
	Widowed	29	14.7
	Other	14	8.6
Educational Level			
	No formal education	47	23.3
	Primary - Secondary	144	71.3
	Completed high school +	11	5.4
Work Status			
	Salaried	21	10.8
	Self-employed	83	42.8
	Home-maker/Unemployed	90	46.4
Ethnicity			

Tamil	172	84.7	
Others	31	15.3	

Table 2 presents the identified univariable factors that showed an association with a high risk of being non-adherent and factors that can reduce the risk of non-adherence to treatment in the slums. In order to identify the predictors of a high-risk profile, these factors were entered into a logistic regression model using a backward stepwise selection procedure based on the Wald score. Missing data were excluded from the analysis.

Table 2. Association of treatment non-adherence with factors predicting non-adherence to treatment

Factors	X^2	Odds Ratio	95% CI for Odds Ratio	
			Lower	Upper
Age				
• 34 - 49	0.4516	1.503	0.520	4.346
• 50+	.0137	3.810	1.315	11.039
Sex	.0256	0.341	0.132	1.524
Work Status	.3600	1.315	0.732	2.362
Ethnicity	.2579	0.674	0.674	4.346
Marital Status	.0538	0.228	0.228	1.012
Alcohol				
• Moderate	.0073	0.206	0.065	1.012
• Binge	.5665	0.539	0.065	4.460
Household chores	0.0010	5.072	1.932	13.317
Feel worse	.3715	.703	0.324	1.524
Doctor Information*	.01789	2.898	1.202	6.990

*Reduce the risk of non-adherence

Ingle and Nath (2008), using national data to establish the socio-economic and health condition of the elderly in India, found that 75% of the elderly are living in rural areas, 73% are illiterate, 48.2% are women, of which 55% are widows. Lastly, 90% are employed in the unorganised sector (e.g. farmers, cleaners, street sellers). They also observed that the elderly in rural areas do not stop working but just reduce the number of hours working on the farm. The elderly in urban settings, on the other hand, are more dependent because they move to urban settings following their sons, with no secure sources of income or property.

4.3.2   Results of the qualitative in-depth and group interviews

Two groups of causal explanations were identified: cultural expectations and behaviour. They both significantly influence the treatment non-adherence of people living in the slums. Two essential elements of cultural expectations were identified: homemakers' responsibility for household chores and dependency on family members. The behavioural explanation was alcoholism.

Women's household responsibilities

Interviewees spoke of the numerous household chores that they do every day. Participants lack time to care for themselves because they are doing all the housework, caring for the children, meeting the needs and demands of their husbands, and attending to the concerns of other family members (Joshi, 2005). The schedule they have to follow demands conscientious fulfilment. Joshi et al. (2011), in a qualitative study of Indian women's self-perception and lives in the slums, noted that it was not only the condition of the slums that burdens them. Socio-cultural expectations of what is a good wife are a huge part of it.

Keeping up with these demands takes its toll on the homemakers. As one participant said, *"Can you still think about medicines or even take your medication if life is one task after another*?" A view shared by another participant, "*We have lots of work. Our entire life is spent doing one chore after another. Do you still expect us to remember medicines? It is the least of our concerns.*"

Elderly and financial dependence

The elderly participants spoke of financial dependence on their family, especially their sons, during times of illness. One of the participants shared, "*If my son gives me money to buy medicines, then I buy. If not, what can I do?",* while another said that with everything gone, "*My son stops taking care of me. We don't talk anymore.*" Retired, unemployed and lacking property and other financial resources, many of the elderly are placed in a weak financial condition. A former government employee shared, "*My pension is not even enough to cover my food and other necessities. So, what will I do? How can I buy my medicines with the little money that I have?*"

Aside from the condition of poverty that elderly people in India are currently exposed to, Kumar (2003) cited two important factors heightening their dependence in his review of the economic security of the elderly in India. The first is the breakdown of the traditional joint family structure that is leading to a more nuclear structure. Second, there is the lack of properly implemented policies and programmes addressing the socio-economic and health concerns of the elderly. Under behaviour, alcoholism has an important implication in treatment non-adherence.

Alcoholism

In Western countries, alcoholism is identified as one of the factors contributing to treatment non-adherence (Lucas, Gebo, Chaisson, & Moore, 2002). In the slums, alcoholism is a major concern with regard to maintaining peace and order both in the family and in the community. Participants blame alcoholism as the cause of family problems that includes a husband assaulting his wife,

husbands not supporting their family, violence, crimes, fights and other similar community disturbances. One of the participants shared, "*Sometimes he gives me money to buy food which is good for several days. But every day, he spends money for drinking. If I ask for more money, he gets mad and I get beaten.*" Another aired her fear and wish, "*When he is drunk, I get beaten. I pray that he stops drinking.*" As another participant puts it, "*Alcohol is the cause of evil in the community. Wives get beaten when husbands are drinking.*" As such, when they were asked if the men's non-adherence to treatment can be caused by their alcohol in-take, all the participants held the view that if men do not adhere to treatment due to their alcoholism, it is their fault. "*If they fail to take their medicines, it is because they are too drunk.*"

4.4 Discussion

In this study, we observed from the quantitative data that both the homemakers and the elderly in the slums have a higher probability of treatment non-adherence. Also, excessive alcohol consumption is a factor for treatment non-adherence in slum communities. Correspondingly, the qualitative data show that homemakers are overworked with household chores and both the homemakers and the elderly are in a situation of dependency on their spouse and son(s), respectively. We also noted that little importance is attached to the possible role of alcoholism in men's treatment non-adherence. Conversely, doctors play a significant role in reversing treatment non-adherence among slum patients.

To confirm that the relation between the variables is not random, we used the X^2 test. Since we aimed to identify the variables strongly associated with treatment non-adherence, the use of Wilcoxon to disaggregate the categorical variables was necessary (de Winter, Dodou, & Wieringa, 2009;Wassertheil-Smoller, 2013).

Homemakers are spouses who are left in the house and whose primary tasks are to manage the home, do household chores and care for the family (Kulkarni, Sarambekar, & Umrikar, 2015). Women are often homemakers, and if a man takes up household work, he scores just as negatively as the women. Hence, regardless of sex, as long as one of the partners is a homemaker in the slums, he/she has an increased 5.0% risk of treatment non-adherence. Our finding clearly identified the 'unemployed people' in the slums who are greatly at risk of treatment non-adherence. To our knowledge, this is one of the first studies showing the strong association between treatment non-adherences and being a homemaker in the slums.

In a survey conducted by Kulkarni et al. (2015), they observed that homemakers spend around six to nine hours doing household work. In fulfilling this task, they experience both personal and social pressure. At the personal level, they base their personal identity and self-worth on how capable they are in performing their household tasks (Kulkarni et al., 2015). There is social

pressure to be efficient in their household chores. It stems from the reality of being subjected to negative impressions from their spouse, family, and neighbours that can have unfavorable repercussions, such as beatings, disagreement between a wife and her mother-in-law, bad reputation in the community (Joshi et al., 2011; Joshi, 2005; Prasad, 2006). On the other hand, fulfilling all the household chores establishes esteem in the community for being a good wife. It brings honour to the husband and the family. Thus, both personal and social pressures experienced by homemakers are more likely to contribute to their being less concerned with their own treatment and self-care as they spend their time and energy in fulfilling their 'inescapable chores'.

As doing household chores is unpaid work (Kulkarni et al., 2015), homemakers become financially dependent on their family, particularly on their spouse. Their financial dependence contributes significantly to their minimal decision-making powers in the family, which in turn further deepens their dependence. This condition highlights why homemakers living with their families are at increased risk of treatment non-adherence. In this regard, it is not only single women living alone who are at an increased risk of treatment non-adherence as found by Conthe et al. (2014) in their consensus document study.

In this regard, burdened by the drudgery of household chores every day for six to nine hours with limited room to flourish in a patriarchal society, homemakers' treatment non-adherence can be considered as a sign of their lack of control over their lives. It affects their self-worth and self-esteem, influencing their perception of life.

Old age is an acknowledged risk for treatment non-adherence (Quinn, Hughes, & Donnelly, 2016). Studies have established a strong correlation between older age and treatment non-adherence (Puts et al., 2013). We found that treatment non-adherence of the elderly in the slums is better explained by their financial dependence on the family, especially their sons, to provide them with the money to pay for their medicines and other health care needs. Elderly people in the slums are often unemployed or engaged in menial labour. Their financial insecurities heighten their dependence on their family. Chandra (2010), in a review of the effect of work-family conditions on modern Indian women, arrived at the conclusion that contemporary Indian society has not changed its expectations and demands of women, young and old alike. Indian society still offers limited space for Indian women's flourishing. In this regard, the condition of dependence disempowers the elderly as shown by their lack of ability to decide on their health care. Their medical response is based on the family's capacities and not on their actual health needs.

Another implication of the financial dependence of the elderly and the homemakers is strained family relations. As opposed to family support of treatment as highlighted in Venkataraman et al.'s (2012) cross-sectional study of diabetic patients, our study presents the scenario of no family support for the treatment of the elderly or the homemaker. We observed that the financial

burden imposed by the treatment of the elderly or homemakers leads to animosity between the parent and the child or between spouses to the point that the patient is neglected.

We also found no significant association between family size and non-adherence to treatment. Bhandari, Sarma, and Thankappan (2015), on the other hand, in a cross-sectional study of adherence to antihypertensive treatment among slum dwellers in Kolkata, India, found that hypertensive patients living in smaller families are more adherent to medication due to communication and family support. Interestingly, this difference may be explained by the patient's perception and beliefs both in their illness and current conditions and relations.

From this perspective, the elderly, just like the homemakers, are constrained in making their own decisions about their treatment. Their financial insecurities bind them to family dependence. This situation could have been eased by the services provided by government health institutions to the underprivileged members of society. However, it is underused. Desai et al. (2014) cited in a review the inadequate amount of time spent by doctors on poor patients as one of the reasons. Das and Hammer (2007) noted in their quantitative study the lower competency of doctors working in a poor neighbourhood compared with the doctors visited by the rich (-0.38 vs 0.42). In a case study of poor people's access to India's health system, Ergler, Sakdapolrak, Bohle, and Kearns (2011) noted discrimination and stigmatization of the poor. Income and poverty confound the real driver of non-adherence, which is inequitable access to sustainable treatment.

Alcoholism is another factor for treatment non-adherence (Anand et al., 2006; Bagchi, Ambe, & Sathiakumar, 2010). Our study confirmed that it is a determinant for treatment non-adherence in slums. Compared to wife beating, fights, lack of support by the husband, family issues and neighbourhood skirmishes resulting from alcoholism, treatment non-adherence is less significant and considered of the least concern by the community members. However, this disregard hides the significant relation of alcoholism to men' treatment non-adherence. It is not only because male members are specifically targeted since alcohol consumption is taboo for women residing in slum communities; treatment non-adherence reduces treatment effectiveness (Gopi, Vasantha, Muniyandi, Balasubramanian, & Narayanan, 2007). At the same time, the non-adherence of women and the elderly is materially affected by alcoholism due to the possible allocation of money to purchase alcohol instead of medicines.

Finally, our research identified doctor information as a significant factor that can reduce non-adherence to treatment in the slums. It collaborates studies asserting the critical role of doctors on the issue (Zolnierek & DiMatteo, 2009). Policy makers and other stakeholders can use this evidence to further encourage doctors to harness their communication skills as they establish solid relations with their patients, especially in the slums. However, this must be critically approached. In a society where doctors enjoy a high status, the trust placed in them may perpetuate the paternalistic relation between doctors and patients.

On the basis of these findings and framed within the idea of social protection and security, it is essential to establish policies and programmes targeting homemakers and the elderly in the slums. Translating this into action, one possible measure is the adoption of a mobile clinic/pharmacy with announced visits in the slums. This could assist homemakers and elderly people who do not leave the community in accessing health services. Another possible action that specifically targets the elderly is discount coupons that they can use to purchase their medicines. On the issue of alcoholism and its relation to treatment non-adherence, awareness raising and information campaigns must be done in the community. Our information may be used to convince the members of the community, especially the men, to control their alcohol intake. Lastly, a more active involvement of doctors in the general campaign to reduce treatment non-adherence should be encouraged as they enjoy the confidence of many members of the slum community.

A limitation of this study was the small size of the sample population. However, this study is not about generalising the results towards other slum communities, but generalising the interpretation of the influence of the specific slum context on treatment non-adherence. The strength of the mixed methods approach is the validation of the qualitative analysis beyond a limited number of informants towards a more representative number of the specific slum population. As the same researcher used both methods on the same population, a higher consistency could be reached by triangulation. It would be interesting to know the extent of the effect of culture on treatment non-adherence in slums.

4.5   Conclusion

In the study performed in some slums in Tamil Nadu, the quantitative analysis found that treatment non-adherence was more likely to be noted in homemakers and elderly people. Results from the qualitative analysis of participant interviews were consistent with that finding. They enabled us to identify and discuss the mechanisms of these associations: homemakers reported a lack of time for self-care, and the elderly were dependent on other household members for money to buy their medication. Both aspects are negatively affected when the male family members spend their money on alcohol. Overall, this suggests that targeting alcoholics, homemakers, and people economically dependent on the family to live could result in an improvement of adherence to treatment in slums.

References

Adane, A. A., Alene, K. A., Koye, D. N., & Zeleke, B. M. (2013). Non-adherence to anti-tuberculosis treatment and determinant factors among patients with tuberculosis in northwest Ethiopia. PloS one, 8(11), e78791.

Airoldi, M., Zaccarelli, M., Bisi, L., Bini, T., Antinori, A., Mussini, C., ... & Suter, F. (2010). One-pill once-a-day HAART: a simplification strategy that improves adherence and quality of life of HIV-infected subjects. Patient Preference and Adherence, 4, 115.

Anand, B. S., Currie, S., Dieperink, E., Bini, E. J., Shen, H., Ho, S. B., ... & VA-HCV-001 Study Group. (2006). Alcohol use and treatment of hepatitis C virus: results of a national multicenter study. Gastroenterology, 130(6), 1607-1616.

Bagchi, S., Ambe, G., & Sathiakumar, N. (2010). Determinants of poor adherence to anti-tuberculosis treatment in Mumbai, India. International Journal of Preventive Medicine, 1(4), 223.

Beaglehole, R., Bonita, R., Horton, R., Adams, C., Alleyne, G., Asaria, P., ... & Cecchini, M. (2011). Priority actions for the non-communicable disease crisis. The Lancet, 377(9775), 1438-1447.

Bhandari, S., Sarma, P. S., & Thankappan, K. R. (2015). Adherence to antihypertensive treatment and its determinants among urban slum dwellers in Kolkata, India. Asia Pacific Journal of Public Health, 27(2), NP74-NP84.

Chandra, V. (2010). Women and Work-Family Interface: Indian Context. Journal of Asia Pacific Studies, 1(2).

Conthe, P., Contreras, E. M., Pérez, A. A., García, B. B., de Cano Martín, M. F., Jurado, M. G., ... & Pinto, J. L. (2014). Treatment compliance in chronic illness: Current situation and future perspectives. Revista Clínica Española (English Edition), 214(6), 336-344.

Creswell, J. W. (2013). Research design: Qualitative, quantitative, and mixed methods approaches. Thousand Oaks, CA: SAGE Publications Ltd.

Damen, J., Thuresson, P. O., Heeg, B., & Lothgren, M. (2008). A pharmacoeconomic analysis of compliance gains on antipsychotic medications. Applied Health Economics and Health Policy, 6(4), 189-197.

Das, J., & Hammer, J. (2007). Location, location, location: residence, wealth, and the quality of medical care in Delhi, India. Health Affairs, 26(3), w338-w351.

de Winter, J. C. F., Dodou, D., & Wieringa, P. A. (2009). Exploratory factor analysis with small sample sizes. Multivariate Behavioral Research, 44(2), 147-181.

Desai, A., Mahajan, N., Sewlikar, S., & Pillai, R. (2014). Medication adherence: the critical step towards better patient outcome. Int J Basic Clin Pharmaco, 27,3(5), 748-54.

Dunbar-Jacob, J., & Mortimer-Stephens, M. (2001). Treatment adherence in chronic disease. Journal of Clinical Epidemiology, 54(12), S57-S60.

Ergler, C. R., Sakdapolrak, P., Bohle, H. G., & Kearns, R. A. (2011). Entitlements to health care: Why is there a preference for private facilities among poorer residents of Chennai, India? Social Science & Medicine, 72(3), 327-337.

Gopi, P. G., Vasantha, M., Muniyandi, M., Balasubramanian, R., & Narayanan, P. R. (2007). Risk factors for non-adherence to directly observed treatment (DOT) in a rural tuberculosis unit, South India. Indian Journal of Tuberculosis, 54(2), 66-70.

Gore, A. D., Dhumale, G. B., Kumbhar, U. T., & Kadam, Y. R. (2015). Treatment adherence of diabetic patients attending diabetic clinic. International Journal of Diabetes in Developing Countries, 35(1), 19-25.

India. Retrieved from http://www.who.int/nmh/countries/ind_en.pdf?ua=1. Accessed on July 21, 2017.

Ingle, G. K., & Nath, A. (2008). Geriatric health in India: Concerns and solutions. Indian Journal of Community Medicine: official publication of Indian Association of Preventive & Social Medicine, 33(4), 214.

Jansà, M., Hernández, C., Vidal, M., Nuñez, M., Bertran, M. J., Sanz, S., ... & Sanz, G. (2010). Multidimensional analysis of treatment adherence in patients with multiple chronic conditions. A cross-sectional study in a tertiary hospital. Patient education and counseling, 81(2), 161-168.

Joglekar, N., Paranjape, R., Jain, R., Rahane, G., Potdar, R., Reddy, K. S., & Sahay, S. (2011). Barriers to ART adherence & follow ups among patients attending ART centres in Maharashtra, India. The Indian Journal of Medical Research, 134(6), 954.

Joshi, K., Kumar, R., & Avasthi, A. (2003). Morbidity profile and its relationship with disability and psychological distress among elderly people in Northern India. International Journal of Epidemiology, 32(6), 978-987.

Joshi, S. (2005). Marriage, Migration and Labour Market in Slum Areas. Nagarlok, 37(3), 34 – 49.

Katz, I. T., Ryu, A. E., Onuegbu, A. G., Psaros, C., Weiser, S. D., Bangsberg, D. R., & Tsai, A. C. (2013). Impact of HIV-related stigma on treatment adherence: systematic review and meta-synthesis. Journal of the International AIDS Society, 16(3Suppl 2).

Kulkarni, M. S., Sarambekar, H. L., & Umrikar, S. (2015). Perceived Exertion of Homemakers While Performing Selected Household Activities and Their Attitude towards These Tasks. International Journal of Innovative Research and Development, 4(9).

Kumar, S. V. (2003). Economic security for the elderly in India: An overview. Journal of Aging & Social Policy, 15(2-3), 45-65.

Kumarasamy, N., Safren, S. A., Raminani, S. R., Pickard, R., James, R., Krishnan, A. S., ... & Mayer, K. H. (2005). Barriers and facilitators to antiretroviral medication adherence among patients with HIV in Chennai, India: a qualitative study. AIDS Patient Care & STDs, 19(8), 526-537.

Le Galès-Camus, C., Beaglehole, R., & Epping-Jordan, J. (2005). Preventing chronic diseases: a vital investment. Geneva: World Health Organization.

Lucas, G. M., Gebo, K. A., Chaisson, R. E., & Moore, R. D. (2002). Longitudinal assessment of the effects of drug and alcohol abuse on HIV-1 treatment outcomes in an urban clinic. Aids, 16(5), 767-774.

Martínez, Y. V., Prado-Aguilar, C. A., Rascón-Pacheco, R. A., & Valdivia-Martínez, J. J. (2008). Quality of life associated with treatment adherence in patients with type 2 diabetes: a cross-sectional study. BMC Health Services Research, 8(1), 164.

Mehta, A. K., & Bhide, S. (2011). Poverty and Poverty Dynamics in India: Estimates, determinants and policy responses. Retrieved 15 October 2013.

Mennini, F. S., Marcellusi, A., von der Schulenburg, J. G., Gray, A., Lévy, P., Sciattella, P., ... & Schmieder, R. E. (2015). Cost of poor adherence to anti-hypertensive therapy in five European countries. The European Journal of Health Economics, 16(1), 65-72.

Mishra, S. I., Gioia, D., Childress, S., Barnet, B., & Webster, R. L. (2011). Adherence to medication regimens among low-income patients with multiple comorbid chronic conditions. Health & Social Work, 36(4), 249-258.

Morisky, D. E., Green, L. W., & Levine, D. M. (1986). Concurrent and predictive validity of a self-reported measure of medication adherence. Medical Care, 67-74.

Osterberg, L., & Blaschke, T. (2005). Adherence to medication. New England Journal of Medicine, 353(5), 487-497.

Prasad, G. (2006). The Great Indian Family: New Roles, Old Responsibilities. Penguin Books.

Puts, M. T. E., Tu, H. A., Tourangeau, A., Howell, D., Fitch, M., Springall, E., & Alibhai, S. M. H. (2013). Factors influencing adherence to cancer treatment in older adults with cancer: a systematic review. Annals of Oncology, 25(3), 564-577.

Quinn, H. L., Hughes, C. M., & Donnelly, R. F. (2016). Novel methods of drug administration for the treatment and care of older patients. International Journal of Pharmaceutics, 512(2), 366-373.

Rasmussen, J. N., Chong, A., & Alter, D. A. (2007). Relationship between adherence to evidence-based pharmacotherapy and long-term mortality after acute myocardial infarction. Jama, 297(2), 177-186.

Reddy, K. S., Shah, B., Varghese, C., & Ramadoss, A. (2005). Responding to the threat of chronic diseases in India. The Lancet, 366(9498), 1744-1749.

Rich, A., Brandes, K., Mullan, B., & Hagger, M. S. (2015). Theory of planned behavior and adherence in chronic illness: a meta-analysis. Journal of Behavioral Medicine, 38(4), 673-688.

Roe, T. L., & Smith, R. B. (2008). Disease dynamics and economic growth. Journal of Policy Modeling, 30(1), 145-168.

Sabaté, E. (Ed.). (2003). Adherence to long-term therapies: evidence for action. Geneva: World Health Organization.

Safren, S. A., Kumarasamy, N., James, R., Raminani, S., Solomon, S., & Mayer, K. H. (2005). ART adherence, demographic variables and CD4 outcome among HIV-positive patients on antiretroviral therapy in Chennai, India. AIDS Care, 17(7), 853-862.

Sarna, A., Pujari, S., Sengar, A. K., Garg, R., Gupta, I., & van Dam, J. (2008). Adherence to antiretroviral therapy & its determinants amongst HIV patients in India. Indian Journal of Medical Research, 127(1), 28.

Scheerer, D., Nimeh, Z., & Weinmann, S. (2016). Public policy and mental health: What we can learn from the HIV movement. Public policy, 2016, 022.

Simpson, S. H., Eurich, D. T., Majumdar, S. R., Padwal, R. S., Tsuyuki, R. T., Varney, J., & Johnson, J. A. (2006). A meta-analysis of the association between adherence to drug therapy and mortality. British Medical Journal, 333(7557), 15.

Sokol, M. C., McGuigan, K. A., Verbrugge, R. R., & Epstein, R. S. (2005). Impact of medication adherence on hospitalization risk and healthcare cost. Medical Care, 43(6), 521-530.

Suresh, K. K., Kumar, C. N., Thirthalli, J., Bijjal, S., Venkatesh, B. K., Arunachala, U., ... & Gangadhar, B. N. (2012). Work functioning of schizophrenia patients in a rural south Indian community: status at 4-year follow-up. Social Psychiatry and Psychiatric Epidemiology, 47(11), 1865-1871.

Szwarcwald, C. L., Corrêa da Mota, J., Damacena, G. N., & Sardinha Pereira, T. G. (2011). Health inequalities in Rio de Janeiro, Brazil: lower healthy life expectancy in socioeconomically disadvantaged areas. American Journal of Public Health, 101(3), 517-523.

Tripathi, S. (2015). Determinants of Large City Slum Incidence in India: A Cross-Sectional Study. Poverty & Public Policy, 7(1), 22-43.

Uplekar, M., Juvekar, S., Morankar, S., Rangan, S., & Nunn, P. (1998). Tuberculosis patients and practitioners in private clinics in India. The International Journal of Tuberculosis and Lung Disease, 2(4), 324-329.

Venkataraman, K., Kannan, A. T., Kalra, O. P., Gambhir, J. K., Sharma, A. K., Sundaram, K. R., & Mohan, V. (2012). Diabetes self-efficacy strongly influences actual control of diabetes in patients attending a tertiary hospital in India. Journal of Community Health, 37(3), 653-662.

Venkatesh, K. K., Srikrishnan, A. K., Mayer, K. H., Kumarasamy, N., Raminani, S., Thamburaj, E., ... & Safren, S. A. (2010). Predictors of nonadherence to highly active antiretroviral therapy among HIV-infected South Indians in clinical care: implications for developing adherence interventions in resource-limited settings. AIDS Patient Care and STDs, 24(12), 795-803.

Vermeire, E., Hearnshaw, H., Van Royen, P., & Denekens, J. (2001). Patient adherence to treatment: three decades of research. A comprehensive review. Journal of Clinical Pharmacy and Therapeutics, 26(5), 331-342.

Vijay, S., Kumar, P., Chauhan, L. S., Vollepore, B. H., Kizhakkethil, U. P., & Rao, S. G. (2010). Risk factors associated with default among new smear positive TB patients treated under DOTS in India. PloS one, 5(4), e10043.

Walshe, L., Saple, D. G., Mehta, S. H., Shah, B., Bollinger, R. C., & Gupta, A. (2010). Physician estimate of antiretroviral adherence in India: poor correlation with patient self-report and viral load. AIDS Patient Care and STDs, 24(3), 189-195.

Wassertheil-Smoller, S. (2013). Biostatistics and Epidemiology: A primer for health professionals. Springer Science & Business Media.

Wild, H. (2012). The economic rationale for adherence in the treatment of type 2 diabetes mellitus. The American Journal of Managed Care, 18(3 Suppl), S43-8.

World Health Organization. (2014). WHO STEPS Surveillance Manual: The WHO STEPwise approach to chronic disease risk factor surveillance. Geneva: World Health Organization. https://doi.org/10.1007/s13398-014-0173-7.2

Yusuf, S., Islam, S., Chow, C. K., Rangarajan, S., Dagenais, G., Diaz, R., ... & Kruger, A. (2011). Use of secondary prevention drugs for cardiovascular disease in the community in high-income, middle-income, and low-income countries (the PURE Study): a prospective epidemiological survey. The Lancet, 378(9798), 1231-1243.

Zolnierek, K. B. H., & DiMatteo, M. R. (2009). Physician communication and patient adherence to treatment: a meta-analysis. Medical Care, 47(8), 826.