Contraceptive use among migrant women in Italy: a multilevel approach

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1. Introduction

Sexual and reproductive health is unanimously defined as a "state of complete physical, mental and social well-beingas regards the reproductive processes, functions and system" attainable through free access to contraceptives and to proper health care services (ICPD, 1994).Estimated incidence of unintended pregnancies andunmet need for contraception along withabortion rates are the appropriate indicators to monitor progress towards reaching the goalof universal right to have a "satisfying and safe sexual life as well as the freedom to decide if, when and how often to reproduce" in those countries where knowledge, access and use of contraceptives are lacking or denied(ICPD, 1994). Until recent years political attention towards this topic has been negligible in high-income countries given the free accessibility to and the relatively low cost of contraceptives. However, the intense international mobility of the last two decades made this a priorityissue among population moved from poor to high-income countries.Studies on sexual and reproductive health dedicated to foreign population have therefore increasedover time in order to increase the contraceptive prevalence and to reduce unmet need and induced abortion as well as to prevent Second Generation female genital cutting.With around five million of foreigners present at the beginning of 2012, Italy is fully involved in this new perspective. Immigrants came to Italy according to the traditional, long term-male-dominated pattern or through the most recent female-driven flowsfrom East Europe, Asia and Africa. The result of those flows is the recent feminization of migrant population as well as the settlement of families. Growing demand of services and assistance arising from these new subjects of migration fuelsthe discussion on immigrants' sexual and reproductive health. In Italy lack of knowledge on these topics resulted in an ideological-driven debate among stakeholders, institutions and researchers.This contribute tries to fill this gap, presenting results from a sample survey on sexual and reproductive health of migrant women living in the Italian region of Lombardy[1]. The research, not by chance granted by Lombardy Region, assessesthe determinants of contraceptiveuse among migrants women emphasizing models-use according to migration patterns, individual characteristics as well as country of origin.

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[1] Lombardy is the first Italian region for number of immigrants, accounting for 25% of the total number of foreigners.

1. Data and Methods

1.1 Data

Data derives from the first regional Survey of Sexual and ReproductiveHealth of Migrant Women (SHMW) conducted in the Italian region of Lombardy in 2010. This survey was based on a regional representative sample of 2.011 women aged 15 to 49, interviewed between February and April 2010 in 9 out of 12 provinces. The sample is representative of the main communitiesliving in Lombardy thru a weighted quota sampling based on estimates by nationality and gender released by the Regional Observatory on Migration (ORIM). To reach the number of interviews requested for each nationality a combination of a facility-based sampling and respondent-driven sampling has been used. 52,4% of the interviewed women were recruited from migrant-dedicated or health facilities (hospitals, family planning clinic, and places offering services for immigrants). To correct the bias due to undersampling of women who might be reluctant to seek services, 47,6 % of the sample was respondent-driven. To obtain a regional representative sample a procedure of data weighting followed the gathering of data. All the interviewers (female and social workers) underwent a special trainingthat includedinterview skills and fieldwork protocol. The questionnaire containsitems on children, prenatal care and delivery assistance for first and last birth, occurrence of induced abortion and miscarriage, use of contraception and opinion on gender roles. Most of the items are similar to the international standard DHS, at the same time migration specific items were included. Aggregate indicators such as Total Fertility Rates and Contraceptive Prevalence derive from Unfpa (2011) estimates while the proportion of family migrants among women is from ORIM data (Farina and Ortensi, 2012). Two models are implemented. Model 1compares current exclusive users of safe (modern) contraceptiontoall other women, while Model 2 analyzes ever-use of contraception.The independent covariates are grouped into individual background variables, normative factors (i.e. norms refer to was the women think is an acceptable behavior) and community characteristics[2].

1.2 Models

As the outcome of the analysisin the two models is dichotomous and the dataset has a hierarchical structure (with women nested in communities), a generalized linear mixed model fitting a two-level random-intercept logistic regression has been used. This model is still quite parsimoniouswhile it allows the simultaneous examination of the effects of group level and individual background

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[2] The detailed discussion of variable selection on the basis of the existent literature on family planning in countries of origin and in emigration is not been included in the current abstract.

variables on family planning use, while accounting for the non-independence of observations within groups. From the multilevel analysis we can estimate the variance in current and lifetime contraceptive use between the communities. These variances representthe unexplained variation in family planning use that remains after accounting for the factors that are included in the model[3]. The multilevel models where fitted using gllamm command in Stata 12. Standard error based on Huber/White/sandwich estimators of the covariance matrix were used in the model along with 30 integration points in the final model to assure a better accuracy (Rabe-Hesketh and Skrondal, 2012)

The model specifies as follows:

$$logit \left\{ Pr\left(y_{ij} = 1 | x_{ij}, \zeta_j \right) \right\} = \beta_1 + \beta_2 x_{2j} + \cdots + \beta_n x_{nj} + \zeta_j$$

Where $Pr\left(y_{ij} = 1 | x_{ij}, \zeta_j \right)$ is the probability of using or having ever used (depending on the model definition) a contraceptive method for the ith woman in the jth cluster. x_{ij} is a vector of covariates corresponding to the ith woman in the jth cluster. The random intercepts $\zeta_j \sim (N, \psi)$ are assumed to be independent and identically distributed across communities j and independent of the covariates x_{ij}. Given ζ_j and x_{ij} the responses y_{ij} for the ith women in the jth cluster are independently Bernoulli distributed.

2. Results
2.1 Sample characteristics and contraceptive use[4]

The mean age of the women interviewed is 32. Some variability exist among nationalities, with a higher percentage of women aged 40 and over among Ukrainian and Moldavian that have also an overall higher age at arrival. The level of education is quite high, with grater prevalence of University graduated among Egyptians (37%) and eastern Europeans, especially those from Ukraine (35,2%) and Moldova (27,9%). The percentage of married women varies widely among nationalities with higher percentages among women mostly characterized by family migration such as women from India (87,6%), Bangladesh (79,9%) or Egypt (79,8%). For these same nationalities also highest prevalence of housewives is observed. Median age at first intercourse is 19, but this value is generally lower among women from sub-Saharan Africa with the exception of women from

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Somalia. The percentage of non-users among sexually active women varies widely among nationalities with higher percentages among Pakistani, Indian and Africans. Highest rate of use of modern methods are found among women from Bangladesh, Ethiopia and Sri Lanka. Migrant women are very familiar to contraceptive methods as the results of decades of Family planning policies in their home country. They "export" at least one of the method prevailing in country of origin.It is worth noting a specialization of methods, such as the injections among sub-Saharan African, the sterilization among Asians as well as withdrawal prevailing in some East European countries. The preferred methods are pill and condom due to its cheapness and readily availability. Non-users among women at risk (women who need contraception to space or limit) are only 6%.This level of unmet need is a negligible proportion comparing to the estimated for world (11%), Africa (21%), Asia and Latin America (10%).The need to limit prevails among migrant women, with one notable exception represented by Sub Sahara Africans for which the need is mainly to space the births, being their demand for children relatively high.

2.3 Multilevel Analysis

Multilevel logistic regression modeling is employed to determine the impact of individual and community factors on contraceptive use. The first model (Model 1) accounts for current exclusive use of modern contraceptives to distinguish women that use only safe contraception from other that may combine modern contraception with traditional methods. Women who were not using any contraceptive method at the time of the survey because pregnant, trying to conceive, sterile or not exposed to sexual intercourseswere excluded from the analysis. This selection resulted in a subsample of 1.055 women (level 1) grouped in 22 nationalities of origin (level 2).

To measure the overall degree of homogeneity in the use of contraception within a community without any attempt to control for individual or community variables, a multilevel logistic model with no observed covariates was fit and intracommunity correlation was calculated. For different women i and $i^{'}$ in the same community j the intracommunity correlation is 0,13 indicating a high level of homogeneity among communities.

Variables that are commonly found meaningfully correlated to the use of family planning in most of countries of origin such as religion, education, marriage status, working status and attitudes towards gender relations were not found significant and were therefore excluded from the final model presented in this abstract. After controlling for individual and community factors the residual intraclass correlation reduces by 82%.

The quantification of the unobserved heterogeneity obtained by considering the median odds ratio for pairs of randomly sampled women having the same covariate value[5]- where the women that has the larger random intercept is compared with the women that has the smaller intercept- is 1,306 which is not a very large odds ratio compared to those for variables included in the model.

At individual level the model shows that controlling for country of origin and community variables, age, number of children ever born and nationality of the partner are significant predictors. The introduction of a quadratic coefficient for age means that highest levels of use are associated to central ages of women'schild-bearing years (15-49). Holding all the other variables constant, younger and older women have a lower exclusive use of modern methods. As for the number of children ever born, the positive squared term means that as the family enlarges, the use of modern contraceptive grows significantly.Women havingan Italian partner are more likely to use only modern contraceptives than those paired with a partner from the same nationality or of another foreign nationality (OR=1,91).

It is worth noting the importance of the community variables. A higher diffusion of modern contraception in the country of origin is associated to an exclusive use of this typology of family planning methods in emigration. According to the model, an increase in the proportion of modern methods of family planning in the country of origin confer an odds ratio of 1,22.The total fertility rate in the country of origin is also positively associated to the use of modern contraception. That is due to the fact that women from low fertility countries of origin such as Eastern Europe or Latin America have a higher concurrent use of traditional methods (in particular withdrawal) and higher rates of voluntary abortion (Farina and Ortensi; 2011). The introduction of the community variable shows that the diffusion of family migration among the community is positively associated to the use of modern contraception: an increase of 20% the diffusion of family migration results in an odds ratio of 1,38.

Model 2 accounts for lifetime use of contraception[6] and the target population here is represented by women who had at least an intercourse allowing a higher sample size(N=1.600). According to the multilevel model without the inclusion of individual and community variables for different women i and i' in the same community j the intracommunity correlations is 0,2: a slightly higher level than that observed for model on current use. After controlling for variables that were found significantly associated to the dependent variable the residual intraclass correlation reduces by 23% and the median odds ratio[1] is 2,08. This result suggests a higher influence of unobserved factors in the determination of the outcome of interest.

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[5] This measure of heterogeneity was suggested by Larsen (2000) et al. $OR_{median} = exp\left\{\sqrt{2\psi}\phi^{-1}(\frac{3}{4})\right\}$

[6] In Model 2 never users of contraception were assigned the code 1 while all other women were assigned the code 0.

The model shows that women with lower level of education, as well as ever married women, are more likely to be never-users of family planning methods. The higher association observed with divorced or widowed is to be explained with earlier cohorts of marriage, controlling for women age that has been included in the model even if found not fully statistical significant (p=0,056). A rise of 20 years in the age results in an odds ratio of 1,63. The number of children is also significant[7]. Attitudes on gender are measured on the basis of agreement to items on gender equality. A higher score is related to lower support of gender equality and is correlated to a lower lifetime use of contraception.

The percentage of family migrants in the community is positively related to uncontrolled fertility: an increase of 20% in the diffusion of family migration among a community confer an odds ratio of 1,52.

Predicted population average probability[8] according to Model 1 shows lower probability of exclusive use of modern methods among Eastern European and Latin Americans. Countries with higher estimated probabilities of use of modern contraceptive are in many cases the same where higher probabilities are estimated by Model 2 on lifetime use of family planning (e.g. Burkina Faso, Senegal, Bangladesh, and Pakistan).

Coefficients from multilevel model examining the odds ofexclusive use of modern contraception (Model 1)

	Coef.	exp(b)	S.E.	P>|z|	95% C.I.
age	0,092	1,236	0,096	0,006	(1,062;1,439)
age (square term)	-0,001	0,997	0,001	0,009	(0,995;0,999)
Number of children ever born	-0,155	0,700	0,12	0,038	(0,5;0,98)
Number of children ever born (s.t)	0,030	1,071	0,037	0,049	(1;1,147)
Italian partner (ref. "No")	0,280	1,906	0,395	0,002	(1,27;2,86)
% of modern methods of f. p. among users in the country of origin	0,009	1,020	0,005	0,000	(1,011;1,029)
% of family migrants	0,007	1,016	0,005	0,002	(1,006;1,027)
Total fertility rate	0,063	1,157	0,078	0,032	(1,013;1,321)
Constant	0,009		0,012	0,000	(0,001;0,111)
ψ	0,078		0,065		
ρ	0,023				
N	1055				
Log likelihood	-600.6				

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[7]As in the previous model the direction of casualty can be ambiguous: a woman that does not control fertility is more likely to have a higher number of children but, at the same time, a higher desire for children implies a lower need to control fertility.

[8]Predicted population-averaged probabilities $\bar{\pi}(x_{ij}) = \int \widehat{Pr}(y_{ij} = 1|x_{2j},..,x_{nj},\zeta_j)\phi(\zeta_j;0,\hat{\psi})d\zeta_j$ were obtained using gllapred procedure in STATA (Rabe-Hesketh and Skrondal, 2012) specifying options "mu" (for the mean response, here a probability) and "marginal" (for integrating over the random-intercept distribution)

Coefficients from multilevel model examining the odds of lifetime non use of contraception (Model 2)

	Coef.	exp(b)	S.E.	P>|z|	95% C.I.
Age	0,024	1,025	0,013	0,056	(0,999;1,05)
education: junior high school (ref. Primary)	-0,489	0,613	0,152	0,048	(0,378;0,996)
education: high school (ref. Primary)	-0,983	0,374	0,095	0,000	(0,228;0,614)
education: university degree (ref. Primary)	-0,744	0,475	0,145	0,015	(0,261;0,865)
marriage status: married (ref. Unmarried)	0,873	2,393	0,608	0,001	(1,455;3,938)
marriage status: divorced (ref. Unmarried)	1,146	3,147	1,078	0,001	(1,609;6,157)
marriage status: widowed (ref. Unmarried)	1,755	5,786	3,146	0,001	(1,993;1,68)
Number of children ever born	-1,347	0,260	0,038	0,000	(0,195;0,348)
Number of children ever born (s.t)	0,128	1,136	0,030	0,000	(1,079;1,196)
attitudes on gender equality	0,344	1,411	0,215	0,024	(1,046;1,902)
% of family migrants	0,021	1,021	0,007	0,003	(1,007;1,035)
constant	-2,824	0,059	0,033	0,000	(0,019;0,179)
ψ	0,581		0,256		
ρ	0,150				
N	1600				
Log likelihood	-522,0				

Predicted mean population average probabilities according to Model 1 and Model 2

Country of origin	Model 1	Model 2	Country of origin	Model 1	Model 2	Country of origin	Model 1	Model 2
Albania	,43	,14	India	,82	,17	Nigeria	,67	,12
Romania	,52	,12	Pakistan	,85	,21	Senegal	,82	,22
Ukraine	,67	,10	Cote d'Ivoire	,69	,14	Somalia	,49	,15
Moldova	,61	,09	Burkina Faso	,86	,22	Eritrea	,68	,10
Bangladesh	,85	,25	Egypt	,86	,16	Ecuador	,70	,06
Sri Lanka	,72	,18	Ethiopia	,78	,09	Peru	,64	,06
China	,74	,10	Ghana	,77	,11	Total	,71	,13
Philippines	,61	,06	Morocco	,80	,17			

3. Discussion

The present analysis suggests some interesting and original conclusions in the European migration context. Both models enlighten that migrants of the same nationality have similar contraceptive behaviors, suggesting that patterns of use of family planning in emigration depend also on socialization. Moreover the use – modern or traditional, at the moment of the survey or during the lifetime - is strongly related to fertility: the higher the number of children, the higher is the use.

As regards to current exclusive use of modern contraception (Model 1) age is a significant predictor as highest levels of use are associated to the central ages of women'schild-bearing years. Also a community indicator as the percentage of "family migrants" among women increases the probability to use modern methods. Total fertility rate and prevalence of modern methods in their own country increase the probability of modern methods use. As for never-users (model 2) less educated, ever-married and family migrants are more likely to be never-users of family planning methods.

Finally, two results are worth noting. Predicted marginal probability of exclusive use of modern methods is estimated to belower among Eastern European and Latin Americans, countries where withdrawal and abortion played an important role in the demographic transitions. Moreover, countries with higher estimated probabilities of use modern contraceptive are in many cases the same where non-users are more represented. This suggests the coexistence of two different

behaviors in the same community: a group which is highly controlled by exclusive use of modern methods especially at higherparities, and another, smaller, who do notcontrol fertility.

4. Limitations

Although the analysis has highlighted various issues of interest it has some limitations.The first and mail drawback is that the analysis uses cross sectional data; therefore direction causality has to be explained with caution. The use of a cross sectional survey that has not an "event oriented observation design" results in an impossibility to use important qualitative variables included in the survey but observed only at the moment of the interview. More of that, accurate time related information about pattern of use, effects of spousal separation and changes in the methods used after migration should be included. The second limitation is the possible existence of a double selection effect, as we have data only on women who were alive at the moment of the interview and did not return to their countries of origin.

Nevertheless this data are a unique source of information in the Italian and European context about contraceptionand sexual and reproductivehealth of migrant.

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