

International Journal of Advanced Biochemistry Research



ISSN Print: 2617-4693
ISSN Online: 2617-4707
NAAS Rating (2026): 5.29
IJABR 2026; SP-10(4): 243-247
www.biochemjournal.com
Received: 01-01-2026
Accepted: 05-02-2026

Suvaran Maigur
Ph.D. Scholar, Department of
Human Development and
Family Studies, College of
Community Science,
University of Agricultural
Sciences, Dharwad,
Karnataka, India

Dr. Prema Patil
Professor and Head,
Department of Human
Development and Family
Studies, College of Community
Science, University of
Agricultural Sciences,
Dharwad, Karnataka, India

Dr. Geeta Tamgale
Assistance Professor,
Department of Extension and
Communication Management,
College of Community Science,
University of Agricultural
Sciences, Dharwad,
Karnataka, India

Corresponding Author:
Suvaran Maigur
Ph.D. Scholar, Department of
Human Development and
Family Studies, College of
Community Science,
University of Agricultural
Sciences, Dharwad,
Karnataka, India

Impact of intervention on reproductive health and nutritional status among migratory women workers in sugarcane harvesting

Suvaran Maigur, Prema Patil and Geeta Tamgale

DOI: <https://www.doi.org/10.33545/26174693.2026.v10.i4Sc.8106>

Abstract

The present study was undertaken to assess the effect of an intervention on reproductive health and nutritional status of migratory women workers engaged in sugarcane harvesting in Bagalkot district. A total of 60 respondents were selected using purposive sampling, comprising 30 in the experimental group and 30 in the control group, focusing on vulnerable women workers. A pre-test-post-test experimental research design was adopted. Data were collected using self-structured questionnaire and standardized tools, including the Reproductive Health Practice Scale developed by Hassan (2002) and nutritional status assessment based on Body Mass Index (BMI) classification as per World Health Organization guidelines. An intervention package consisting of 10 sessions was administered once a week over a period of two and a half months for the experimental group, while the control group did not give any intervention. Statistical analysis was performed using frequency, percentage, chi-square test, and paired t-test. The findings revealed a significant improvement in reproductive health and a positive, though moderate, improvement in nutritional status among the experimental group following the intervention, whereas no significant changes were observed in the control group. The study concludes that structured intervention programmes are effective in improving the health outcomes of migratory women workers and emphasizes the need for sustained and comprehensive efforts to enhance their overall well-being.

Keywords: Migratory women workers, Sugarcane harvesting, Reproductive health, Nutritional status, Intervention programme

Introduction

Migration for sugarcane harvesting is a widespread seasonal livelihood strategy in several regions of India, particularly in states like Maharashtra and Karnataka, where large numbers of rural households migrate in search of employment (Food and Agriculture Organization, 2019; International Labour Organization, 2020) [2, 4]. Among these migrant populations, women constitute a significant proportion of the workforce and play a dual role as both income earners and primary caregivers (Rao and Raju, 2020) [7]. Despite their substantial contribution to the agricultural economy, migratory women workers remain one of the most vulnerable and marginalized groups, often exposed to adverse living and working conditions that severely affect their health and well-being (International Labour Organization [ILO], 2020; International Institute for Population Sciences [IIPS] & Ministry of Health and Family Welfare [MoHFW], 2020) [4, 3].

Reproductive health is a critical component of overall health among women, encompassing aspects such as menstrual health, maternal care, family planning, and access to healthcare services (World Health Organization, 2016) [11]. However, migratory women engaged in sugarcane harvesting face multiple challenges in maintaining reproductive health. The nature of their work involves long working hours, strenuous physical labor, lack of privacy, and inadequate sanitation facilities at worksites. Studies have reported a high prevalence of menstrual irregularities, reproductive tract infections, early age at marriage, repeated pregnancies, and limited access to antenatal and postnatal care among these women (International Institute for Population Sciences and Ministry of Health and Family Welfare, 2021) [3]. Furthermore, social and cultural barriers, coupled with low literacy levels, restrict their awareness and utilization of reproductive health services (Desai and Vanneman, 2015) [1].

Nutritional status is another crucial determinant of health, directly influencing women's productivity, reproductive outcomes, and overall quality of life (United Nations Children's Fund, 2019) ^[10]. Migratory women workers in sugarcane harvesting often experience poor nutritional intake due to irregular meals, food insecurity, and limited access to diverse and nutritious foods during migration periods. Their diets are typically monotonous and deficient in essential nutrients, leading to conditions such as undernutrition, anemia, and chronic energy deficiency. The high energy demands of manual labor, combined with inadequate dietary intake, further exacerbate their nutritional vulnerabilities (Rao and Raju, 2020) ^[7]. Additionally, repeated pregnancies and inadequate spacing between births contribute to the depletion of maternal nutritional reserves (World Health Organization, 2016) ^[11]. The intersection of poor reproductive health and compromised nutritional status creates a cycle of ill health among migratory women workers, affecting not only the women themselves but also the health of their children and families. These issues are further intensified by lack of access to healthcare facilities, absence of social security measures, and the temporary and mobile nature of their livelihood (International Labour Organization, 2020) ^[4]. Despite the growing recognition of their contribution to the agricultural sector, there remains a significant gap in research and policy interventions addressing the specific health needs of migratory women in sugarcane harvesting.

Methodology

The present study was conducted among migratory women workers engaged in sugarcane harvesting in Bagalkot district. A total sample of 60 respondents was selected for the study. Among them, 30 respondents were assigned to the experimental group and 30 respondents to the control group. The selection of respondents was carried out using a purposive sampling technique, wherein vulnerable women workers were identified and included in the study. Vulnerability was determined based on factors such as poor reproductive health status, low nutritional status associated with sugarcane harvesting work. A pre-test was conducted for both groups to assess the baseline status of the respondents with respect to reproductive health and nutritional status. Following the pre-test, the experimental group was exposed to the intervention programme, while the control group continued with their routine activities without any intervention. After completion of the intervention, a post-test was conducted for both groups using the same tools and procedures as in the pre-test. The changes observed between pre-test and post-test in both groups were compared to evaluate the effectiveness of the intervention.

Tools use

1. Self-structured schedule: A self-structured schedule was used to collect baseline information from the respondents. It consisted of basic demographic and personal data, including age, education, food habits, duration of migration, age at menarche, duration of menstrual flow, age at marriage, age at first pregnancy, spacing between children, incidence of stillbirth, breastfeeding practices, number of children, type

of family, size of the family.

2. Reproductive health practice scale by Hassan (2002)

The scale consisted of 24 items. The scale covered questions related to conception and childbirth, safe motherhood, fertility regulation methods and sexually transmitted infections (STIs)/acquired immune deficiency syndrome (AIDS). Each item had three alternative responses: Always, Sometimes and Never, scored as 3, 2 and 1, respectively. The total score ranged from 24 to 72, with higher scores indicating better reproductive health practices. The reliability of the tool was measured using the Guttman split-half coefficient and it was found to be 0.79, indicating acceptable internal consistency.

Category	Score range
Poor	24-40
Average	41-56
High	57-72

3. Nutritional status assessment scale by WHO

The nutritional status of women was assessed by measuring anthropometric parameters such as weight and height. Weight was measured using a digital weighing balance, while height was measured using an anthropometric rod. The Body Mass Index (BMI) of each woman was calculated as an indicator of nutritional status.

Body Mass Index calculation (WHO): BMI was calculated by dividing the woman's weight in kilograms (kg) by the square of height in meters (m²). The BMI values were then used to classify the nutritional status of the respondents according to standard WHO guidelines, with specific cut-off points for underweight, normal weight, overweight and obesity.

Intervention: An intervention package was developed and implemented for the respondents in the experimental group. The intervention consisted of a total of 10 sessions, conducted once a week over a period of two and a half months. Each session was systematically planned to address the key issues related to reproductive health and nutritional status of vulnerable migratory women workers engaged in sugarcane harvesting in Bagalkot district. The sessions were delivered in a structured manner, ensuring active participation of the respondents. Appropriate teaching methods such as lectures, discussions, video, demonstrations, and interactive activities were used to enhance understanding and retention of information. The intervention programme focused on improving awareness, knowledge, and practices related to health and nutrition. Each weekly session covered specific topics, and the content was delivered progressively to build comprehensive understanding among the participants.

The experimental group attended all 10 sessions during the intervention period, while the control group did not receive any form of intervention during this phase. After completion of all sessions, a post-test was conducted to assess the effectiveness of the intervention package by comparing the pre-test and post-test results.

Activities of intervention chart

Session 1: Orientation and baseline awareness	
Objectives	Build rapport, explain the purpose, assess current knowledge.
Activities	Ice-breaking activities and group introduction.
	Discussion on common health issues faced by women.
	Importance of reproductive health and nutrition in their work context.
Methods	Group discussion and sharing of health issues
Duration	1 hour
Session 2: Understanding Women's Body and Basics of Reproductive Health	
Objectives	Increase knowledge of reproductive anatomy, menstruation and hygiene.
Activities	Simple explanation of reproductive system using visuals.
	Discussion on menstrual hygiene, safe practices and myths
	Demonstration of sanitary methods (cloth, napkins, disposal).
Methods	Charts, group discussion and demonstration
Duration	1 hour
Session 3: Family Planning and Safe Motherhood	
Objectives	Promote awareness about contraception, spacing, and maternal care.
Activities	Discussion on importance of child spacing for women's health.
	Explanation of contraceptive methods (pills, IUDs, condoms, natural methods).
	Maternal care practices: antenatal visits, iron/calcium intake and danger signs.
Methods	Interactive talk and real-life examples
Duration	1 hour
Session 4: Common Reproductive Health Issues	
Objectives	Identify and manage problems like infections, heavy bleeding, anemia.
Activities	Symptoms and prevention of RTIs/STIs.
	Emphasize early diagnosis and referral to PHC/ASHAs
Methods	Guest lectures
Duration	1 hour
Session 5: Nutrition Basics for Women	
Objectives	Improve knowledge of balanced diet using locally available foods
Activities	Demonstration of food groups and importance of each.
	Discuss seasonal, low-cost nutritious options.
	Identify food taboos and clarify misconceptions
Methods	Lecture and PPT
Duration	1 hour
Session 6: Anemia Prevention and Micronutrients	
Objectives	Address high prevalence of anemia.
Activities	Discuss causes, symptoms, and effects of anemia.
	information of iron-rich recipes (millets, jaggery, green leafy vegetables).
	Importance of iron/folic acid tablets and Vitamin C-rich foods.
Methods	Group discussion, sharing anemia screening info.
Duration	1 hour
Session 7: Nutrition during Pregnancy and Lactation	
Objectives	Educate about increased nutritional needs in pregnancy and lactation
Activities	Discussion on high-energy, protein-rich foods.
	Importance of hydration, rest, and supplementation.
	Address common problems like nausea, cravings, cultural food restrictions.
Methods	Lecture and Video playing
Duration	1 hour
Session 8: Occupational Health and Nutrition Link	
Objectives	Connect heavy workload with nutritional needs and reproductive health
Activities	Identify energy demands of sugarcane cutting.
	Teach easy-to-carry nutritious snacks (groundnuts, jaggery, sprouts).
	Hydration practices to prevent dehydration and heat stress.
Methods	Group discussion.
Duration	1 hour
Session 9: Mental Health, Stress and Social Support	
Objectives	Address psychological burden and social relationship issues.
Activities	Sharing circles on stress and challenges during migration.
	Relaxation techniques (breathing, stretching).
	Building peer-support groups among women.
Methods	Relaxation exercises, motivational stories
Duration	1 hour
Session 10: Rights, Entitlements and Access to Services	
Objectives	Empower women with knowledge of health schemes and support systems.
Activities	Awareness on government programs (ICDS, Janani Suraksha Yojana, PDS).
	Guidance on how to access PHC, ASHA workers, mobile clinics.
	Building collective voice for better working conditions
Methods	Guest health worker talk.
Duration	1 hour

Statistical methods: The data collected from the respondents were systematically coded, tabulated, and analyzed using appropriate statistical methods. Descriptive statistics such as frequency and percentage were used. The Chi-square test was used to determine the association between categorical variables. The paired t-test was

employed to assess the effectiveness of the intervention by comparing the pre-test and post-test mean scores of the experimental group.

Results and Discussion

Table 1: Association of reproductive health and nutritional status of migratory women workers in sugarcane harvesting at pre and post-test

	Intervention group (n = 30)			Control group (n = 30)		
	Pre-test	Post-test	χ^2	Pre-test	Post-test	χ^2
Reproductive health						
Poor	18(60.00)	8(26.66)	9.68*	15(50.00)	14(46.67)	1.06 ^{NS}
Average	12(40.00)	19(63.34)		13(43.33)	14(46.67)	
High	0(0.00)	3(10.00)		2(6.67)	2(6.66)	
Total	30(100.00)	30(100.00)		30(100.00)	30(100.00)	
Nutritional status						
Underweight	15(50.00)	6(20.00)	9.98*	13(43.33)	14(46.67)	2.19 ^{NS}
Normal weight	12(40.00)	22(73.34)		13(42.33)	11(36.67)	
Overweight	3(10.00)	2(6.66)		4(13.34)	5(16.66)	
Total	30(100.00)	30(100.00)		30(100.00)	30(100.00)	

Figures in the parenthesis indicated percentage

*Significant at 0.05 level NS-Non-significant

Table 1 presents the association between reproductive health and nutritional status of migratory women workers engaged in sugarcane harvesting at pre and post-test in both intervention and control groups. In the intervention group (n = 30), a marked improvement was observed in reproductive health status after the intervention. At pre-test, 60.00 percent of the women were in the poor category, 40.00 percent were in the average category and none of them in the high category. However, at post-test, 26.66 percent of women in the poor category decreased substantially while 63.34 percent moved to the average category and 10.00 percent reached the high category. The calculated Chi-square value ($X^2 = 9.68^*$) indicated a statistically significant association between pre and post-test reproductive health status in the intervention group. Similar findings were reported by Desai and Vanneman, 2015 [1], found that increased awareness and access to health services contributed to better reproductive health outcomes among women.

Similarly, significant improvement was observed in nutritional status. Initially, 50.00 percent of the women were underweight, 40.00 percent had normal weight and 10.00 percent were overweight. Following the intervention, the proportion of underweight women reduced to 20.00 percent, while the normal weight category increased notably to 73.34 percent and overweight decreased to 6.66 percent. The Chi-

square value ($X^2 = 9.98^*$) was found to be significant, indicating that the intervention had a positive impact on nutritional status. Likewise, Rao and Raju, 2020 [7], reported that nutrition-based interventions among women agricultural workers resulted in a decline in undernutrition and improvement in overall nutritional status.

In contrast, the control group (n = 30) did not show significant changes in either reproductive health or nutritional status. In terms of reproductive health, the proportion of women in the poor category marginally decreased from 50.00 percent to 46.67 percent, while the average category slightly increased from 43.33 percent to 46.67 percent, and the high category remained almost unchanged. The Chi-square value ($X^2 = 1.06^{NS}$) indicated a non-significant association. Likewise, nutritional status in the control group showed minor fluctuations, with underweight increasing slightly from 43.33 percent to 46.67 percent, normal weight decreasing from 42.33 percent to 36.67 percent, and overweight increasing marginally from 13.34 percent to 16.66 percent. The Chi-square value ($X^2 = 2.19^{NS}$) was non-significant. Hence, it can be inferred that significant improvements in reproductive health and nutritional status were observed only among women who received the intervention, whereas no significant changes were noted in the control group.

Table 2: Comparison of mean scores of reproductive health and nutritional status of migratory women workers in sugarcane harvesting at pre and post-test

	Intervention group			Control group		
	Pre-test	Post-test	Paired t-test	Pre-test	Post-test	Paired t-test
	Mean $\pm$ SD	Mean $\pm$ SD		Mean $\pm$ SD	Mean $\pm$ SD	
Reproductive health	38.43 $\pm$ 5.94	46.34 $\pm$ 6.78	7.99*	28.84 $\pm$ 5.84	29.12 $\pm$ 6.13	1.06 ^{NS}
Nutritional status	17.38 $\pm$ 4.53	18.74 $\pm$ 5.72	1.54*	17.10 $\pm$ 5.75	17.83 $\pm$ 5.98	1.08 ^{NS}

*Significant at 0.05 level NS-Non-significant

Table 2 presents the comparison of mean scores of reproductive health and nutritional status of migratory women workers engaged in sugarcane harvesting at pre-and post-test levels in both intervention and control groups. In the intervention group, the mean score of reproductive health increased from 38.43 $\pm$ 5.94 at pre-test to 46.34 $\pm$ 6.78 at post-test. The calculated 't' value (t = 7.99*) was found to

be statistically significant, indicating a significant improvement in reproductive health following the intervention. These findings are in line with the study conducted by Santhya *et al.* (2010) [9], which reported that improved awareness and access to reproductive health information significantly enhanced women's reproductive health outcomes. Similarly, Saggurti *et al.* (2012) [8]

observed that targeted health interventions among migrant women in India led to better reproductive health practices and reduced vulnerability to reproductive morbidities.

Similarly, the mean score of nutritional status in the intervention group increased from 17.38 ± 4.53 at pre-test to 18.74 ± 5.76 at post-test. The paired 't' value ($t = 1.54^*$) was statistically significant, showing a positive effect of the intervention on nutritional status. These findings are supported by the National Nutrition Monitoring Bureau (NNMB, 2017) ^[5], which reported that nutritional interventions and awareness programmes among rural women resulted in gradual improvements in dietary intake and nutritional status, though the changes were not immediate. Similarly, Rao *et al.* (2014) ^[6] found that women from economically weaker sections showed modest improvements in nutritional status following nutrition education, emphasizing that such changes occur progressively over time.

In contrast, the control group did not show significant changes in mean scores. The mean reproductive health score increased marginally from 28.84 ± 5.84 at pre-test to 29.12 ± 6.13 at post-test, with a non-significant paired 't' value ($t = 1.06\text{NS}$). Likewise, the mean nutritional status score showed a slight increase from 17.10 ± 5.75 to 17.83 ± 5.98 , but the paired 't' value ($t = 1.08\text{NS}$) was non-significant.

Conclusion

The present study concludes that migratory women workers engaged in sugarcane harvesting in Bagalkot district face significant challenges related to reproductive health and nutritional status due to their migratory lifestyle, occupational workload, and poor socio-economic conditions, as reflected in their low to moderate baseline health status. The structured intervention package consisting of 10 sessions over two and a half months proved to be effective in significantly improving reproductive health and bringing about a positive, though moderate, improvement in nutritional status among the experimental group, while no significant changes were observed in the control group. This clearly indicates that planned, need-based intervention programmes play a vital role in enhancing the health outcomes of vulnerable populations, and highlights the need for sustained efforts, including continuous health education, nutritional support, and broader socio-economic improvements, to achieve long-term well-being among migratory women workers.

References

1. Desai S, Vanneman R. India Human Development Survey-II (IHDS-II), 2011-12. University of Maryland and NCAER; 2015.
2. Food and Agriculture Organization (FAO). The State of Food and Agriculture 2018: Migration, Agriculture and Rural Development. Rome: FAO; 2019.
3. International Institute for Population Sciences (IIPS), Ministry of Health and Family Welfare (MoHFW). National Family Health Survey (NFHS-5), 2019-21: India Report. Mumbai: IIPS; 2021.
4. International Labour Organization (ILO). Labour migration in rural areas and agriculture. Geneva: ILO; 2020.
5. National Nutrition Monitoring Bureau (NNMB). Diet and nutritional status of rural population: Technical

Report No. 27. National Institute of Nutrition (ICMR), Hyderabad; 2017.

6. Rao KM, Balakrishna N, Arlappa N, Laxmaiah A, Brahman GNV. Diet and nutritional status of women in India. *Indian J Med Res.* 2014;140(5):537-546.
7. Rao N, Raju S. Gendered time use and nutrition outcomes in agriculture-dependent households. *Feminist Econ.* 2020;26(3):1-27.
8. Saggurti N, Mahapatra B, Sabarwal S, Ghosh S, Johri A. Male out-migration: A factor for the spread of HIV infection among married men and women in rural India. *PLoS One.* 2012;7(9):e43222. doi:10.1371/journal.pone.0043222.
9. Santhya KG, Ram U, Acharya R, Jejeebhoy SJ, Ram F, Singh A, *et al.* Associations between early marriage and young women's marital and reproductive health outcomes: Evidence from India. *Int Perspect Sex Reprod Health.* 2010;36(3):132-139. doi:10.1363/3613210.
10. United Nations Children's Fund (UNICEF). The State of the World's Children 2019: Children, Food and Nutrition. New York: UNICEF; 2019.
11. World Health Organization (WHO). WHO recommendations on antenatal care for a positive pregnancy experience. Geneva: WHO; 2016.