

# Urban–Rural Disparities in Knowledge and Practices of Play-Based Child Development among Anganwadi Workers: A Cross-Sectional Comparative Study

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## ABSTRACT

**Background:** Early childhood is an important time to develop both neurocognitive and social/psychological skills. Strategies that use play as a base for learning are often viewed as critical in the educational system for young children. The Anganwadi Worker (AWW) is the first educator and provider of preschool services in India, working through the ICDS program. The differing levels of training that AWWs receive, infrastructure they have at hand, and supervisory support they receive in urban versus rural areas likely affect how well they implement play-based developmental practices.

**Objective:** To compare knowledge, attitudes, and practices related to play-based child development among urban and rural Anganwadi Workers.

**Methods:** A cross-sectional comparative study was conducted among 80 AWWs (Urban: n=50; Rural: n=30). A structured questionnaire assessed knowledge, attitude, and practice. Normality was confirmed using Shapiro–Wilk testing. Independent samples t-test was applied ( $\alpha=0.05$ ).

**Results:** Rural AWWs had significantly greater work experience compared to urban AWWs ( $22.70\pm 11.10$  vs  $15.20\pm 9.96$  years;  $p=0.003$ ). No statistically significant differences were observed in knowledge ( $p=0.314$ ), attitude ( $p=0.081$ ), or practice ( $p=0.522$ ) scores. Both groups demonstrated high performance ( $>75\%$ ) across all domains.

**Conclusion:** Despite differences in experience, urban and rural AWWs exhibited comparable levels of knowledge and implementation of play-based developmental practices. Structured continuing education programs may further enhance uniformity in service delivery.

**Keywords:** Anganwadi workers, early childhood development, play-based learning, knowledge-attitude-practice.

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## INTRODUCTION

The first years in life are a key time for developing brains to mature — when children develop rapidly through forming new connections among neurons and synapses [1,2]. Studies in developmental neuroscience show that the environment children experience during this time has a lasting impact on their long-term cognitive development, their ability to emotionally regulate themselves, and their behavior [3,4].

Because play helps children learn to communicate through language, learn how to think, solve problems,

and self-regulate (control) their emotions and behaviors, it has been called one of the most important aspects of young children's educational experiences [5-7].

Guided and structured play experiences help enhance neural plasticity and support the strengthening of executive control networks [8-9].

Globally, The World Health Organization and UNICEF have emphasized nurturing care and play as key strategies to maximize child development [10-11]. In India, the Integrated Child Development Scheme

## Urban–Rural Disparities in Knowledge and Practices of Play-Based Child Development among Anganwadi Workers: A Cross-Sectional Comparative Study

(ICDS) was established in 1975 with a purpose to provide a range of services that include preschool education through the operation of Anganwadi Centres [12]. Anganwadi workers are the frontline service providers that provide early childhood care, nutritional knowledge, and developmental monitoring [13].

Although globally organizations including the World Health Organization and UNICEF support nurturing care and play as essential strategies for children's development as part of their overall visions of child development — India supports this vision through its ICDS program (Integrated Child Development Services).

In addition, although policy frameworks for early childhood education in India include the National ECCE Curriculum and National Education Policy 2020 that support the use of structured play-based pedagogies for young children — there are many disparities across urban and rural areas for how well these policies will be implemented based on differences in availability of infrastructure, availability of refresher training, quality of supervisory systems and quality of workloads assigned to AWWs (Anganwadi Workers) in urban and rural areas; previous studies have shown that there is variability in the adequacy of training, standards of services and levels of worker retention among AWWs.

The study indicates that urban workers are generally better at delivering supplementary nutrition as well as some educational aspects of their work (21). Conversely, rural worker's often show a strong focus on growth monitoring as well as greater community involvement, largely due to a higher level of local connection and length of employment (19)(21-24). While specific gaps exist within different settings such as immunization practices (25), mental health awareness (26), infection control and prevention (27), and oral health education (23)(28-31) this may indicate that knowledge does not always equate to practice. The variances in knowledge among workers are reflective of differences in; infrastructure, training, supervisory support and workload for each geographic location.

Although there are many differences in the services provided by Anganwadi workers, very few studies have studied the various components of their service (e.g., nutrition, vaccinations) as part of a comprehensive evaluation of how they use play-based approaches, which will restrict our ability to gain a complete view of Anganwadi Worker competence across settings. Comparing knowledge, attitudes and practices regarding KAP among urban and rural AWWs systematically is necessary to identify gaps, create targeted capacity-building strategies that provide the best use of resources, and facilitate an equitable and effective delivery of early childhood development interventions. Such information is vital for improving the implementation of ICDS programs, and for using play in development of children in all settings.

There is currently a lack of literature comparing the knowledge and application of play-based child development among urban and rural AWWs. Therefore, this study was designed to investigate potential urban-rural differences in the areas of knowledge, attitudes and practices related to play-based child development.

### METHODOLOGY

#### Materials and Methods

##### Study Setting and Design (Figure 1)

A comparative cross sectional study was conducted in both urban and rural areas of Belagavi District of Karnataka State of India. The purpose of this comparative cross sectional study was to find out whether there is a difference in knowledge, attitudes, and practices of Anganwadi Workers (AWWs) about play based child development in urban and rural Anganwadis that are being run by the Anganwadi workers who work for the ICDS Scheme. In total 80 AWWs participated in this study which included 30 AWWs from Urban Anganwadis and 50 AWWs from Rural Anganwadis. play-based child development.

Prior to initiating this study, ethical clearance was granted by the Institutional Ethics Committee. Official lists of Anganwadi Centres (AWCs) were acquired from the Child Development Project Office (CDPO), Belagavi. Thirty Anganwadi workers' centres were

## Urban–Rural Disparities in Knowledge and Practices of Play-Based Child Development among Anganwadi Workers: A Cross-Sectional Comparative Study

randomly sampled using simple random sampling from the combined urban and rural lists of AWCs. Personal contact was made with AWWs operating at each centre that was sampled. The purpose and objectives of the study were clearly communicated to all participants and prior to obtaining their written informed consent to participate in this study, those workers that were absent on the date of data collection or declined to participate were not included in the sample.

### Data Collection Procedure

Data were collected one at a time for each individual using a structured, pre-validated questionnaire to evaluate knowledge, attitudes, and practices (KAP), as they relate to play-based child development (32). The KAP questionnaire was originally developed in English and then translated into Kannada and Marathi using a standard forward-backward translation method with certified translators to verify that the translations maintained both the linguistics and conceptually equivalent. Permission was granted to use/adapt this tool from the original author.

The knowledge domain was defined by 16 questions with ratings based on a 5-point Likert scale that ranged from "Strongly Disagree" to "Strongly Agree." The Attitude domain was made up of 13 items with ratings based on a 4-point Likert scale that ranged from "Never" to "Always." The Practice domain included 13 questions with ratings based on a 5-point scale from "No" to "Always." Higher scores in each domain indicated higher levels of knowledge, more positive attitudes toward play, and stronger implementations of play-based practice.

The completed surveys were reviewed for completeness and then coded and entered into Microsoft Excel for data review purposes. All data were then exported to SPSS version 29.0 for statistical analysis.

### Statistical Analysis

Descriptive statistics are used to present data on demographic measures and KAP scores. Continuous variables are typically presented with the mean and standard deviation; categorical responses are generally presented by frequency and percentage. To evaluate

whether these continuous variables follow a normal distribution, a Shapiro-Wilk Test is conducted for each of the following continuous variables separately for both urban and rural groups: age, years of experience, knowledge score, attitude score, and practice score. Since all of the continuous variables demonstrated a normal distribution ( $p > .05$ ), it follows that parametric statistical tests should be used.

T-tests for independent samples were performed to identify the comparison between demographic characteristics and KAP (Knowledge-Attitude-Practice) scores of urban versus rural water, sanitation and hygiene (AWWs). An effect size was determined by calculating Cohen's  $d$  to measure how large the difference is between groups. The relationship among the three KAP scores was measured with a Pearson correlation coefficient. A  $p < .05$  will be used as an indicator that results are statistically significant.

### Results

A total of 80 Anganwadi workers participated in the final analysis; 30 of them were urban Anganwadi workers, and 50 were rural Anganwadi workers. The mean age of all of the participants was  $46.15 \pm 8.80$  years. The mean age of the urban AWWs was  $44.94 \pm 8.58$  years. The mean age of the rural AWWs was  $48.17 \pm 8.93$  years. There was no statistical significance to the difference in age between the two groups ( $p=0.113$ ). [Table 1]

The mean length of service for the AWW in an urban environment is  $15.20 \pm 9.96$  years; however, rural AWW have significantly more experience (mean of  $22.70 \pm 11.10$  years). The difference between the two groups was found to be statistically different ( $t = -3.122$ ,  $p = .003$ ) which shows that there was a significantly larger time span of employment for the rural AWW when compared to the urban AWW. [Table 2]

In terms of educational qualifications, it can be seen that many of the AWW have completed secondary and pre-university education; although, as far as educational qualifications are concerned, there were slightly more educated AWW in the urban population.

## Urban–Rural Disparities in Knowledge and Practices of Play-Based Child Development among Anganwadi Workers: A Cross-Sectional Comparative Study

### **Knowledge Regarding Play-Based Child Development (Table 3)**

The average test scores for the AWW's in an urban area were  $66.10 \pm 5.17$  on a total of 80 (that is equivalent to 82.62%) as compared to those living in a rural area which was  $64.70 \pm 7.14$  on a total of 80 (equivalent to 80.88%). There was no statistical significance in the average scores of knowledge between the two ( $p = 0.314$ ) and it has a small effect size (Cohen's  $d = 0.234$ ).

Most item-wise analysis revealed that most participants were in agreement, or in strong agreement that children learned almost entirely by means of playing, that playing promoted children's cognitive, social, logical and communication skills and that early exposure to many different types of toys contributed positively to developmental outcomes for children. The data also showed that greater than eighty percent of respondents felt that the act of playing increased bonding and created a foundation for other skills (such as storytelling and pretending) among family members. However, it is estimated that more than sixty percent of all participants agreed with the notion that there should be specific toy types designed for boys and girls due to a continuing acceptance of some older views on this topic.

### **Attitude Toward Play-Based Learning (Table 3)**

While rural AWWs' mean scores were  $39.53 \pm 6.16$  (76.03%) and their urban counterparts had a mean of  $41.92 \pm 5.66$  (80.62%); however, both groups had significantly higher positive attitudes than negative attitudes and there was an almost statistically significant difference ( $p = .081$ ) in attitude scores for the two groups ( $t = 1.767$ ), with a relatively low to moderate effect size (Cohen's  $d = 0.408$ ).

Most of the respondents stated that they often have play with children who initiate interaction. A large number of employees said they plan to have time for play and provide tools that will help develop their skills. Nonetheless, around 45% stated they find it difficult to continue having play after a long working day due to fatigue or burdened by it. Also, many employees prefer structured play. This suggests an inclination toward adults directing as opposed to children directing the activity.

### **Play-Based Practices (Table 3)**

Urban AWWs were found to have a mean practice assessment score of  $58.04 \pm 5.47$  (or 89.29%), as compared to  $57.23 \pm 5.35$  (or 88.05%) for rural AWWs. The difference in scores was found to be statistically insignificant ( $t = .643$ ;  $p = .522$ ) with an extremely small effect size (Cohen's  $d = .149$ ).

More than 65 percent of the sample population engaged children in gentle physical activities at least once a day (gross motor skills and clapping games) while nearly all (more than 90 percent) of the participants encouraged fine motor skills (grasping, shaking, and manipulating toys). More than two thirds of participants used colorful, textured, and shaped toys for cognitive development; while almost all (nearly 100 percent) of the participants encouraged language based interactions (reciting songs, reading to them, repeating words), and most (the majority of) the participants encouraged socio-emotionally related activities (turn taking games and facial imitation).

Both urban and rural AWWs showed high rates of implementation of physical, cognitive, language, and socio-emotionally related play.

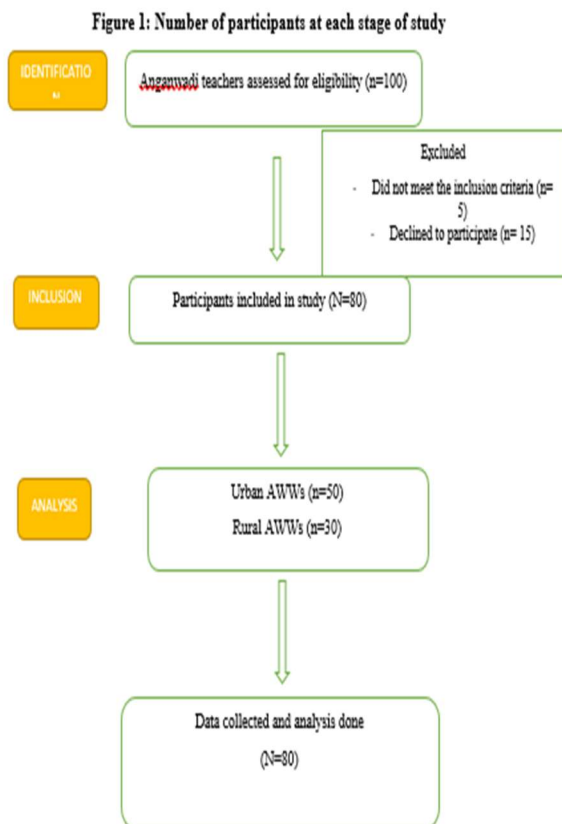
### **Correlation Between Knowledge, Attitude, and Practice (Table 3)**

The results of the Pearson correlation analysis showed that there was a moderate positive relationship ( $r = 0.428$ ) between knowledge and attitudes ( $p < 0.0001$ ). The results suggest that those teachers with high levels of knowledge concerning the benefits of Play-Based Learning also demonstrated a more favorable attitude towards it. There was a very small but statistically significant positive relationship ( $r = .245$ ) found to exist between knowledge and practice ( $p = 0.028$ ); thus, as teachers' knowledge regarding the use of Play-Based Learning increases so does their ability to implement it effectively. No statistically significant relationship ( $r = 0.120$ ) was identified between attitude and practice ( $p = 0.288$ ).

Overall, the results indicate that knowledge is a primary factor in determining both attitudes and practices; however, having a positive attitude does not

# Urban–Rural Disparities in Knowledge and Practices of Play-Based Child Development among Anganwadi Workers: A Cross-Sectional Comparative Study

ensure that an individual will consistently implement the practices they support.



**Table 1: Demographic characteristics comparison**

Variable	Urban (n=50) Mean ± SD	Rural (n=30) Mean ± SD	t-value	p-value
Age (years)	44.94 ± 8.58	48.17 ± 8.93	-1.604	0.113
Experience (years)	15.20 ± 9.96	22.70 ± 11.10	-3.122	<b>0.003*</b>
Education Level				
SSLC	17 (34.0%)	17 (56.7%)	-	-

PUC-12	26 (52.0%)	12 (40.0%)	-	-
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Note: \*\* p < 0.01 (highly significant)

**Table 2: Tests of Normality (Shapiro-Wilk Test)**

Variable	Group	n	Shapiro-Wilk Statistic	p-value
Age	Urban	50	0.968	0.196
Age	Rural	30	0.955	0.082
Experience	Urban	50	$\chi^2 = 8.702$	<b>p = 0.034*</b>
Experience	Rural	30	0.945	0.127
Knowledge	Urban	50	0.970	0.234
Knowledge	Rural	30	0.964	0.379
Attitude	Urban	50	0.975	0.369
Attitude	Rural	30	0.951	0.181
Practice	Urban	50	0.952	0.089
Practice	Rural	30	0.937	0.076

Note: All variables showed normal distribution (p > 0.05) in both urban and rural groups, meeting the assumption for independent samples t-test. Significance level:  $\alpha = 0.05$ .

**Table 3: Relation between knowledge, attitude, and practice**

Domain	Urban (n=50) Mean ± SD	Rural (n=30) Mean ± SD	t-value	p-value	Cohen's d
Knowledge Score (Max: 80)	66.10 ± 5.17	64.70 ± 7.14	1.014	0.314	0.234
% Score	82.62%	80.88%	-	-	-
Attitude Score (Max: 52)	41.92 ± 5.66	39.53 ± 6.16	1.767	0.081	0.408
Practice Score (Max: 65)	58.04 ± 5.47	57.23 ± 5.35	0.643	0.522	0.149

Note: No statistically significant differences were found between groups in KAP domains (all p > .05)

## DISCUSSION

The current research found that there were no significant differences in urban and rural AWWs' (1) knowledge, (2) attitudes, (3) practices of using a play-

## Urban–Rural Disparities in Knowledge and Practices of Play-Based Child Development among Anganwadi Workers: A Cross-Sectional Comparative Study

based approach for promoting children's development as individuals. Rural AWWs had significantly longer tenure of work than urban AWWs.

As tenure increases so does the ability to understand context and engage with the community [33]; however, the length of time that rural AWWs worked was not directly correlated with their level of knowledge or practice based on this study.

Urban practitioners reported slightly greater means for all areas (and may have received better access to refresher training programs, as well as exposure to new preschool curriculum models) [15,34]. The results are consistent with previous Indian research on AWWs' baseline competency, based upon formal training in the ICDS framework [21,22].

Scores in both groups indicating high levels of practice (>88%), suggest the structured approach to play-based methods is being implemented effectively. Research indicates that structured play-based environments, improve the development of executive function and early learning outcomes [6,8,35].

Well-trained community-based childcare providers have also been shown to be able to positively impact early childhood developmental trajectories at a global level [37-39]. The lack of significant urban-rural disparities in this research indicates that the training provided through the ICDS has been disseminated with some degree of consistency across all settings.

Therefore, continued professional development is necessary to continue to provide high-quality services as well as to be aware of changes within education policy [40].

The present study is limited by some constraints, when we interpret the results. First, because this research was done in a single District (Karnataka-Belagavi) and as such, the results could have limited applicability for all other districts of India with different socio-cultural, administrative, and infrastructure environments.

Second, the use of a cross-sectional approach limits our capacity to determine if there are causative relationships among the knowledge, attitudes, and

practices domains. While there were statistically significant associations among the three areas, we cannot assert that improved knowledge will necessarily result in lasting positive changes in attitudes and behaviors over time.

Third, the self-reporting nature of the survey that was used for the study's data collection may have been affected by social desirability bias. Fourth, the study compared both urban and rural settings, but did not analyze other contextual factors such as the amount of work load the teachers are under, whether or not there is an abundance of play materials available, the infrastructure of the school/center, the quality of supervision, and if the workers receive refresher training in their positions.

Lastly, the exclusion of Anganwadi Workers that were absent at the time of the data collection may result in selection bias, since it is possible that the absenteeism of the worker is associated with job dissatisfaction, workload, or systemic issues.

Future studies will have to be large enough to assess regional differences and to better understand the generalizability of these results, using either longitudinal or interventional study designs, or both, to measure the effects of a structured training program for Anganwadi Workers (AWs) as well as the causal relationship between knowledge improvement and the adoption of more effective play-based practices. To further demonstrate that an increase in knowledge translates into a longer term improvement in play-based practice, a pre-post model can be used.

It is hoped that future studies will be able to measure the effect of an Anganwadi Workers play-based practices on a number of developmental outcomes in children, specifically in cognitive development, language development, social/emotional development and gross/fine motor skills, and this information will be utilized to support advocacy for policy changes in addition to providing a framework for improvements within the ICDS system.

## CONCLUSION

## Urban–Rural Disparities in Knowledge and Practices of Play-Based Child Development among Anganwadi Workers: A Cross-Sectional Comparative Study

The Rural Anganwadi workers demonstrated a higher level of work experience than their urban counterparts, however there were no statistical differences identified with respect to knowledge, attitudes, and practices regarding play-based child development.

Both groups showed similar competency levels, which demonstrates the effectiveness of the training provided through ICDS. Providing additional refresher training for both groups as well as providing ongoing support to all supervisors will assist in establishing consistency and quality of the preschool education services that are being provided.

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Urban–Rural Disparities in Knowledge and Practices of Play-Based Child Development among Anganwadi Workers: A Cross-Sectional Comparative Study

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