

The Effectiveness of the Beti Bachao Beti Padhao Scheme: Evidence from Madhya Pradesh (2015-2023)

Anant Bhartia¹, Rushaan Agarwal¹ and Rashmi Baruah[#]

¹Dhirubhai Ambani International School, India

[#]Advisor

ABSTRACT

The Beti Bachao Beti Padhao scheme was introduced by the Indian government in 2015 to address the declining Child Sex Ratio (CSR), change discriminatory societal attitudes towards the girl-child, and promote educational opportunities for girls. This paper will focus on the extent to which the Beti Bachao Beti Padhao scheme has impacted the education of the girl child in India since its inception. The education of the girl child has long been a source of market failure in a largely unequal society, such as India. This question is answered through a survey we conducted of 114 households in the Alirajpur district in Madhya Pradesh using the cluster sampling model and an analysis of secondary data and literature. 89.47% of the survey respondents were very or somewhat aware of the scheme, with 63.16% of respondents mentioning that it encouraged them to enroll their children in school, with financial assistance and scheme publicity being the biggest motivators. 40.35% of respondents claimed that the scheme improved the overall literacy rate in their village, and over half the respondents reported improvements in the quality of education. Retention rates did not increase significantly as per the respondents. Our results show the scheme, although has positively impacted the education of the girl child in India, still faces limitations in context to its efficiency and the impact relative to the budget allocated by the government. Our research acts as a guide for amendments to the BBBP scheme along with recommendations for future policymaking.

Introduction

Gender equality has been considered for a long time as essential to sustainable and inclusive economic development. Even the Sustainable development goal (goals 4 and 5) focuses on the provision of education to all and gender equality. Amartya Sen defines development as the freedom individuals have to choose to live their life by their own desires (O'Hearn, 2009). For him this freedom is availed by building up human capabilities. When capabilities have been built up humans acquire the freedom to choose to live their life as they want too. Even economically this allows individuals to be made as productive as possible, and education is the process through which this can be achieved. However, India has historically shown high levels of gender inequality in the context of education, child-sex ratio, income and employment opportunities, and overall decision-making autonomy. In 2011 the CSR ratio in India was 918 girls to every 100 boys (George et al., 2021). In 2011 64% of girls were enrolled in primary school compared to 80% of boys (George et al., 2021). The reason for such rampant inequality is rooted deeply in social and economic perceptions of women in Indian society. Women are seen in society as property of not her parents but her husband. These patriarchal standards are prevalent due to several reasons. For example, many religious rituals are performed only by the son of the household. There also exists this perception specifically in rural India that women are supposed to merely restrict their role to domestic work. For this reason, the education of women has not particularly been an important aspect for families. Even economically, due to societal standards parents of the girl child are expected to pay dowry and for the wedding (Joshi & Bora Sharma, 2021). Moreover, unlike a son the girl child is not expected to earn income for the family post marriage. This along with the higher expenses of sanitation required to raise a girl

child means, parents tend to prefer having a son over a girl. This was the context with which the Beti Bachao Beti Padhao scheme was started.

The Beti Bachao Beti Padhao (BBBP) scheme was launched on January 22, 2015 (Kanchan et al., 2019). It was introduced to address the declining Child Sex Ratio (CSR) in India, which was highlighted during the 2011 census. Further, the scheme seeks to ensure the survival, protection, and education of the girl child. The scheme initially targeted 100 districts with the lowest CSR, but eventually expanded to become a nationwide scheme (Kanchan et al., 2019). The scheme is broken up into 3 parts to achieve these objectives: 1) Advocacy and media campaigns to change societal attitudes towards having a girl-child. These were nationwide campaigns to educate orthodox parents, provide information regarding CSR ratios, and eliminate discrimination. 2) Multi-sectoral interventions in gender-critical districts (Kanchan et al., 2019). These aimed to improve SRB in gender-critical districts by 2 points per year, reduce gender differentials in child mortality rates, provide functional toilets for girls, improve nutritional status by reducing the number of underweight girls, and more (Kanchan et al., 2019). 3) Sukanya Samriddhi Scheme, a deposit scheme with income tax benefits and a high deposit rate of 7.6% for parents of girl children to challenge the burden mindset (Kanchan et al., 2019). The national initiative is jointly run by The Ministry of Women & Child Development (MoWCD), Ministry of Health & Family Welfare (MoH&FW) and Ministry of Human Resources Development (MoHRD), each with different roles and responsibilities.

The scheme however has come into question for its inefficiency in dealing with the issue of the empowerment of the girl child. The scheme has allocated close to 50% of its budget to promotion and media related activities, whilst the spending on education is in the single digits (ISPP, 2023). The involved ministries claim the scheme targets the root cause which is patriarchal standards in Indian society. However, in the short run the scheme must sort of adopt a form of quasi-affirmative action sort of spending to see direct results in the various indicators it seeks to improve. Moreover, questions of only 20% of the allocated budget being spent and lack of transparency in implementation on the district level, raise questions about corruption and whether the scheme is as effective as it could be (ISPP, 2023).

The education for the girl child has been a source of market failure. Despite being a merit good, individuals are simply unaware of its importance. Hence, the market under allocates resources to its provision, leading to allocative inefficiency. Because of this a welfare loss is created and the result is market failure. Thus, the BBBP aimed to increase awareness about the importance of girl's education to internalize the positive externality and increase societal welfare.

Research into the effectiveness of the scheme is crucial for a variety of reasons. The scheme addresses a highly relevant and critical problem, and hence its success can result in both macroeconomic objectives through increased skilled labor participation coming from women, but also benefit at the individual level, allowing women to become more independent and contribute to the household instead of being perceived as a burden. Information regarding the factors that have led to the success and drawbacks of the scheme is crucial for the development of future schemes. Further, identifying the pitfalls of the scheme gives policymakers a focal point for future amendments to the scheme. Administrative problems with the scheme that are identified, like problems with budget efficiency, may not only apply to this scheme but to schemes of the Indian government as a whole, thus highlighting areas of improvement in policy administration.

Existing literature already covers the impact of the BBBP scheme on the Child Sex Ratio, leaving the scheme's impact on education as a clear information gap. This paper seeks to evaluate the effectiveness of the scheme in this regard, thus painting a complete picture of the scheme's success or lack thereof. Our research question "To what extent has the Beti Bachao Beti Padhao scheme impacted girl child education in India since 2015?" will use a myriad of primary and secondary sources to support our analysis and point to areas in which the BBBP and any future government policy can improve upon.

Literature Review

The BBBP scheme was implemented to address the declining Child Sex Ratio (CSR), and to enhance women empowerment through the promotion of education and healthcare (India Brand Equity Foundation). It seeks to achieve this

using media campaigns and through interventions in gender critical districts. Before answering the question, it is important to evaluate existing literature on the BBBP scheme to evaluate existing knowledge, gaps in it, research methodologies previously used, and collect other information that would aid in structuring this study as focused and effective. Google Scholar was primarily used for the literature review, with the Keywords “Beti Bachao Beti Padhao, effectiveness, impact, strengths and weaknesses, education.” Further, Government reports, research from private organizations, and articles from news organizations were also evaluated.

The paper, “Awareness of women regarding Beti Bachao and Beti Padhao scheme” conducts a study in the Kalyanpur and Chaubeypur blocks of Kanpur Nagar (Devi et al., 2021). In each block, 6 villages were selected, and from each village, 25 respondents. This is a cluster sampling method, demonstrating its potential in future research. More than 50% of respondents had low education and qualifications, and a majority belonged to a backward caste (Devi et al., 2021). Despite this, the majority of respondents were aware of the scheme, demonstrating the far-reaching impact of the media campaigns, and they were aware that it was implemented to reduce crimes against the girl child and ensure protection, education, and adequate nutritional status, showing that knowledge beyond the surface level was present (Devi et al., 2021). However, the study did not investigate the actual educational impact of the scheme and stopped at awareness.

The paper “Effectiveness of India’s National Program to save the girl child: experience of Beti Bachao Beti Padoo (B3P) program from Haryana State” is a comprehensive study evaluating the extent of improvement in Sex Ratio at Birth (SRB) in Haryana since the implementation of the scheme (Pareek, 2021). Segmented time-series regression analysis was used with monthly SRB data. The sex-ratio at birth increased from 827 girls per 1,000 boys in January 2005 to 900 girls per 1,000 boys in September 2016 (Pareek, 2021). The study found that there was an insignificant change in SRB before the intervention, but an increase in SRB of 1.696 per month under the BBBP scheme (Pareek, 2021). Evidently, the media campaigns have caused a shift in societal mindset towards female feticide. However, this data solely represents a change in SRB, and may not suggest improved survival rates, or improvements in healthcare and education. These are crucial further research points.

The paper, “Knowledge and Attitude Regarding “Beti Bachao, Beti Padhao Yojana” among Young and Aged Rural Adults a Cross-Sectional Study” conducted a survey of 200 young and aged adults at Buddhi village of the Dehradun district using nonprobability convenient sampling technique (Chouhan et al., 2022). The study found that 59% of the survey respondents had moderate knowledge of the scheme, and 77% had a favorable opinion of the same (Chouhan et al., 2022). Given that the media campaigns are the major area of expenditure under the scheme, a higher awareness rate would be expected. Further, the study only looks at overall awareness, without any tangible measures of education. This is a characteristic of many other studies, and while awareness of the scheme is a step towards correcting gender inequality, a progressing education and healthcare system will truly bring about the change.

The paper, “Awareness on Gender Empowerment and Beti Bachao Beti Padhao Through Intervention” conducted a survey of 30 people (15 girls and 15 ladies) from labor colony (CSS Haryana Agricultural University) of the Hisar district (Saini & Sangwan, 2018). The survey indicated that both the girls and the ladies were not aware of women empowerment and the scheme (Saini & Sangwan, 2018). This is a surprising result given that the majority of scheme funds have been spent on campaigning, and that many other papers have suggested strong awareness of the scheme. Additionally, the scheme targets districts in Haryana due to their high levels of gender inequality, making the results more perplexing. These results can be attributed to the small sample size, or that the Hisar district was not adequately covered under the scheme campaigns, implying that a more organized district-wise implementation is required.

The Paper, “An Evaluation of India's Beti Bachao Beti Padhao Scheme” presents the findings of a study conducted by the National Council of Applied Economic Research (NCAER) (Jaiswal et al., 2020). It was conducted to understand the impact of the media and awareness campaigns. 816 households were selected from 17 districts across 14 states, marking one of the geographically largest studies conducted for this scheme. The target group for the field survey includes only those parties who are supposed to benefit from the scheme or administer it. The study found that the scheme was successful in creating overall awareness (Jaiswal et al., 2020). However, “The non-availability of

functional and clean toilet facilities for girls in most schools discourages them from attending school regularly (Jaiswal et al., 2020).” Given that 97.4% of government schools have girls’ toilettes, this paper indicates that many may not be functional or clean for usage and further mentions that this causes erratic attendance or dropouts, increasing the gender gap and inequality (Jaiswal et al., 2020). This paper suggests that media campaigns, which have been the main focus of the scheme, are not enough to address the problem, and that lapses in infrastructure are proving more detrimental to human capital development in the girl child (Jaiswal et al., 2020). A further analysis of the educational realities under the scheme can give a clearer picture of the extent of non-media improvements required in the future.

The study, “An Evaluation of “Beti Bachao Beti Padhao” Scheme Implemented in Vijayapura District in Karnataka State” by the Government measures the impact of the scheme across its 3 objectives (preventing gender-biased sex selective elimination, ensuring survival and protection of the girl child, ensure education and participation of the girl child) (Government of Karnataka, 2020). The study is conducted with the pretense that not only socio-economic, but socio-cultural and religious changes are required to empower women. The study found that 61.3% changed their perspective of looking at women, awareness had been spread about the legal marriage age, and TV and newspaper commercials were most impactful (Government of Karnataka, 2020). However, despite these changes, a male child was still highly favorable, with 41.2% wishing to have a male child, only 4.3% wishing to have a female child, and 11.8% never wanting a female child: Dowry and future expenses were cited as the main reasons for this, along with female children being more vulnerable to atrocities (Government of Karnataka, 2020). Evidently, just media awareness is not enough, and financial provisions in education and healthcare are required. The study found that only 24.9% wanted their girl child to continue education till high school, and only 8.7% till graduation, meaning that retention rate should be a focus (Government of Karnataka, 2020). To ensure education, fair opportunity, and participation of the girl child, the paper suggests that higher and professional education should be made free for girls, 50% job reservation for girls, and increased awareness schemes (Government of Karnataka, 2020). These suggestions are more radical than the BBBP, and their viability can be investigated.

A variety of secondary articles highlight high levels of inefficiency in utilizing the allocated budget of the scheme. An article from The Hindu features a quote from the Parliamentary Committee on Empowerment of Women, “Now, it is time to focus on other verticals to help achieve measurable outcomes related to education and health,” since 80% of the funds have been spent on media and campaigns (Changra, 2021). This is visible from the results of previous surveys explaining that while there is awareness, there has not been much reported improvement in facilities and other provisions.

An article from The Times of India, “Beti Bachao Beti Padhao – A critical review of implementation” covers 3 critical challenges being faced by the scheme: 1) Inefficient allocation of release funds, 2) Implementation challenges – cases of Haryana and Panjab, 3) Unbalanced expenditure patterns (Nikore, 2019). Although a total budget of Rs. 368 crores were allocated to the BBBP scheme, only Rs. 291 crore was actually released, and more than half of it was released in a single year (2017-2018) (Nikore, 2019). The article explains that this increase of funds followed a report that explained, “less than 20% of the total funds released by the Centre had actually been spent at the State level in 2016-17 (Nikore, 2019).” These figures indicate a poorly planned expenditure, and potential corruption, given the small fraction of the allocated funds actually spent. In terms of the implementation challenges, the article points out that of the 6.36 crores of funds released for Panjab between 2014-2016, only 0.91 crores were utilized until March 2016 and that there were infrequent task force meetings in both Haryana and Panjab (Nikore, 2019). Lastly, non-compliance with guidelines was prevalent, with rewards not being given to schools, and monthly progress reports delayed (Nikore, 2019). These failures support the information from the previous surveys explaining the lack of improvement in education and healthcare and have occurred not because of a poor structure, but because of poor administration of the scheme. Lastly, the article highlights the unbalanced expenditure patterns, with 43% of funds on average being allocated for media campaigns, but only 5% each for education and healthcare related interventions (Nikore, 2019). The extent of struggle in these areas needs to be further investigated and will be addressed in this paper.

The article, “Has Beti Bachao Beti Padhao’s Media Advocacy Focus Achieved the Desired Outcomes?” also criticizes over-expenditure on media campaigns and discrepancies in the scheme’s financing and questions whether

the improvements in various parameters can even be attributed to the scheme in the first place (Rana, 2024). The article explains that only 18% of allocated funds (41 of 222 crore) were spent until December 31, 2022, a “gross underutilization” of funds as pointed out in the Rajya Sabha (Rana, 2024). The article highlights unrecorded expenditures, diversion of funds, and unjustified increase in the 2022-2023 funds given a shift to 0-budget advertising. These discrepancies lead the author to question whether the improved parameters reported under the scheme can be attributed to the scheme, given that there has been no significant expenditure outside of media campaigns. For example, Mission Poshan 2.0 has interventions that address many of the same objectives. The article suggests that the BBBP scheme can be enhanced by integrating with other existing schemes and focus more on the education and health side (Rana, 2024).

The literature review has indicated that, through primarily media campaigns, the BBBP scheme has made progress in reforming the CSR ratio and has spread nationwide awareness of the importance of the girl child in varied socio-economic communities. However, inefficiencies in the budget have reduced the scheme’s scope in directly improving education and healthcare facilities. Almost no studies investigate the true impact on education and healthcare and stop at awareness. They also fail to probe why parents may still be apprehensive about having a girl child, despite being aware of the scheme. Although studies cover discrepancies in the budget, no study has investigated the presence of corruption within the scheme. Lastly, there is a lack of longitudinal studies (studies where the same subject is questioned over different periods of time), which can help track the progress of the scheme. This paper addresses the lack of information regarding the educational impact, and the reasons for persisting apprehensions.

For our sample, we randomly interviewed parents of girl children in the Alirajpur district of Madhya Pradesh. The sample was purposely restricted to rural regions, specifically 12 villages near the city of Indore, as the BBBP was primarily targeted at rural regions. We used cluster sampling, interviewing only parents with female children. However, which parents we interviewed were decided randomly, with the exception that the gender of the parents interviewed was roughly kept equivalent. We did not initially consider this a factor, hence had to standardize it.

Methods

This study surveyed 114 families in Madhya Pradesh (MP), specifically from villages in the Alirajpur district, to investigate the impact of the Beti Bachao Beti Padhao. Both these locations were strategically chosen for the study. Madhya Pradesh represents a wide range of demographic groups, including urban, rural, and tribal, meaning that a survey conducted in MP would include a diverse socio-economic population (Government of Madhya Pradesh, 2000). Additionally, MP has historically shown gender inequality. As per the 2011 population census, the male literacy rate in MP stood at 78.73%, while the female literacy rate stood at 54.49% (Jagran Josh, 2013). This gap can help us investigate whether the BBBP scheme has changed the educational landscape since its implementation.

For a survey to be accurate, the sample surveyed should be representative of the population. However, using simple random sampling for a region as big as the Alirajpur district would be time-consuming and resource intensive. Thus, we used cluster sampling. The district is divided into various villages, each acting as a cluster since each contains a diverse population of different socio-economic backgrounds. We surveyed households in 12 villages and took a simple random sample in each village.

Systematically creating the survey questionnaire is also important. Initially, the survey consisted of 20 questions and was a combination of multiple-choice questions and short answer questions. We added a diverse range of questions for the first draft, intending to optimize the questionnaire later. We conducted a pilot test of this questionnaire with 5 households and found that the short-answer questions yielded vague and highly varied responses driven by emotions, while the MCQs gave more statistically useful data. Additionally, we found that 8 of the 20 questions were redundant. For example, the question on midday meals would not contribute to this study as this scheme is not a part of BBBP. Our final survey consisted of 12 questions and was divided into the following categories to paint a complete picture: 1) Enrollment Rate, 2) Retention Rate, 3) Quality of Education, and 4) Literacy rate.

Usually, such surveys are administered using digital means like a Google form. However, we found this unfeasible since not all households knew how to use the survey software. Further, just an online form without further guidance would leave some questions open to interpretation and misunderstanding. Thus, we decided to manually sit with each household and explain each question and entered the results into a Google Sheet.

After the results of our survey were collected, we translated such responses into English and presented them in the form of pie charts. Analyzing a cause-effect relationship was much beyond the scope of our research which was an observational study. We simply aimed to gauge the perception around the BBBP and how at least in an observational sense it created an environment for empowering the education of the girl child. We compared the percentage of certain responses and what they implied in context to the state of girl child education in the respective villages.

An important aspect of conducting research is maintaining ethical standards and honesty. We ensured that not only were our questions not biased to a specific response but also left the identity of the respondents anonymous. We asked the permission of the person we interviewed beforehand and on a number of occasions asked them if they felt the questions were too intrusive. If in the case someone was not willing to participate, we did not force them too. During our analysis we stayed honest to the data we collected and cited all of our secondary sources.

Any research has its strengths and limitations. So, whilst our methodology utilized a variety of research methods and sources, it often made generalizations without enough national-level data. Even our survey suffered from certain biases, however some margin of error is intrinsic to any sample no matter how large it is. Moreover, in order to evaluate the success of the scheme beyond our own primary research we used a plethora of secondary sources. These included government data sets, news articles, and journal articles. We aimed to use secondary research as a means of substantiating and analyzing the trends seen in our primary research itself.

Results

This section of the paper presents the results from the survey conducted. The data is represented through pie charts and is divided into 4 sections. 1) Enrollment Rate, 2) Retention Rate, 3) Quality of Education, 4) Literacy Rate.

Enrollment Rate

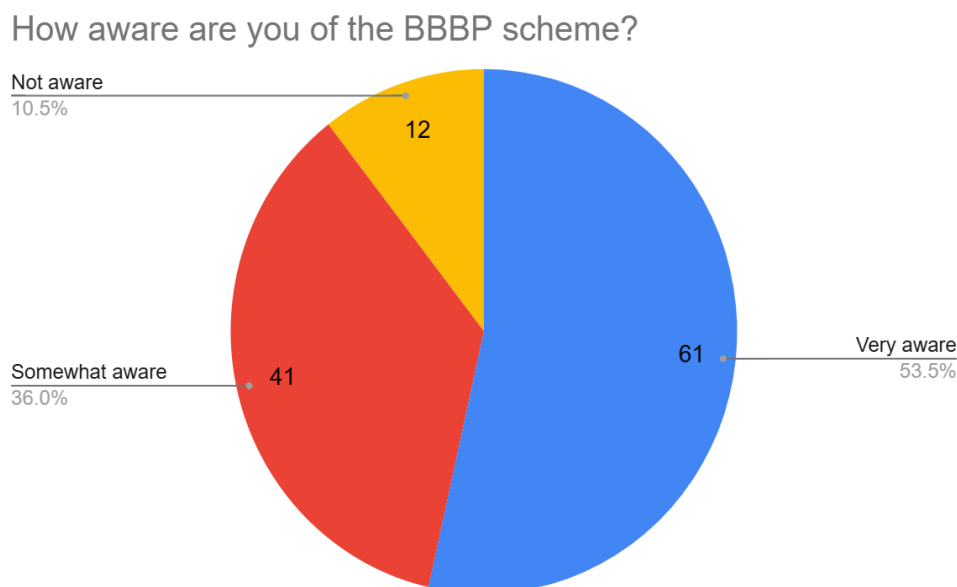


Figure 1. Distribution of respondents by their awareness of the BBBP scheme.

Has the BBBP scheme encouraged you to enroll your children in school?

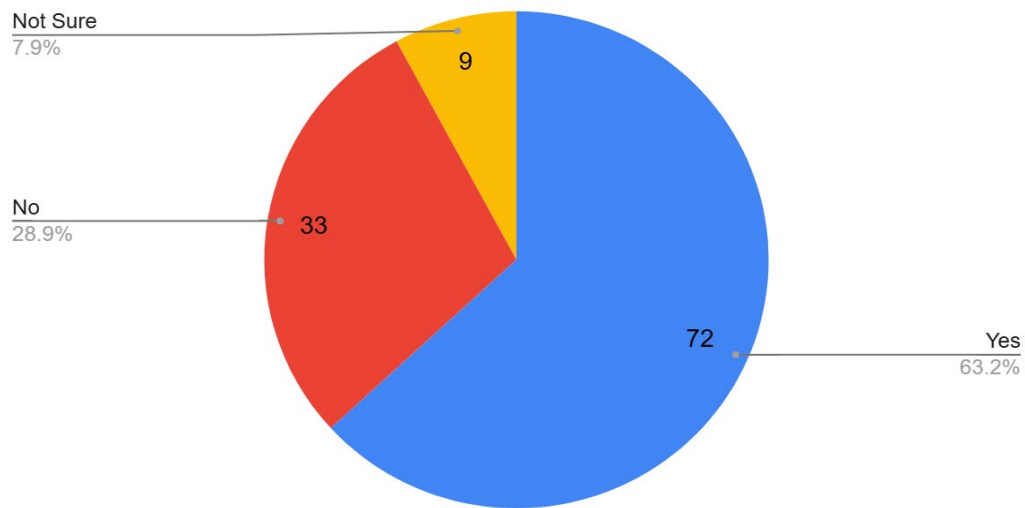


Figure 2. BBBP scheme's impact on parental education enrollment decisions.

What factors influenced your decision to enroll your children in school?

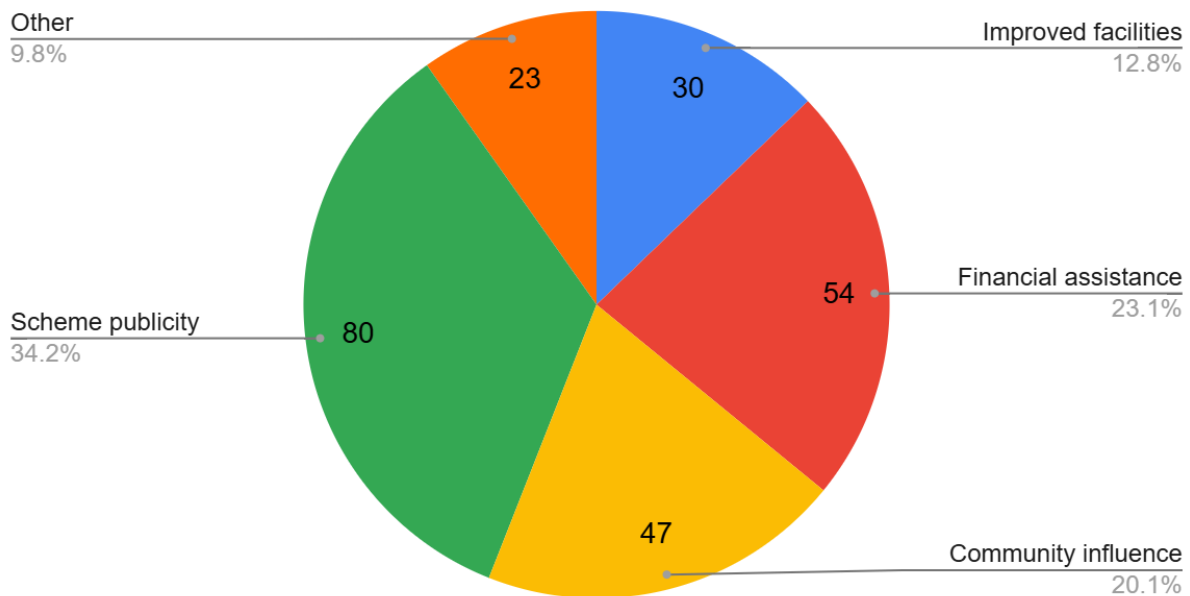


Figure 3. Factors influencing school enrollment.

How has the BBBP scheme impacted the school enrollment rate in your village?

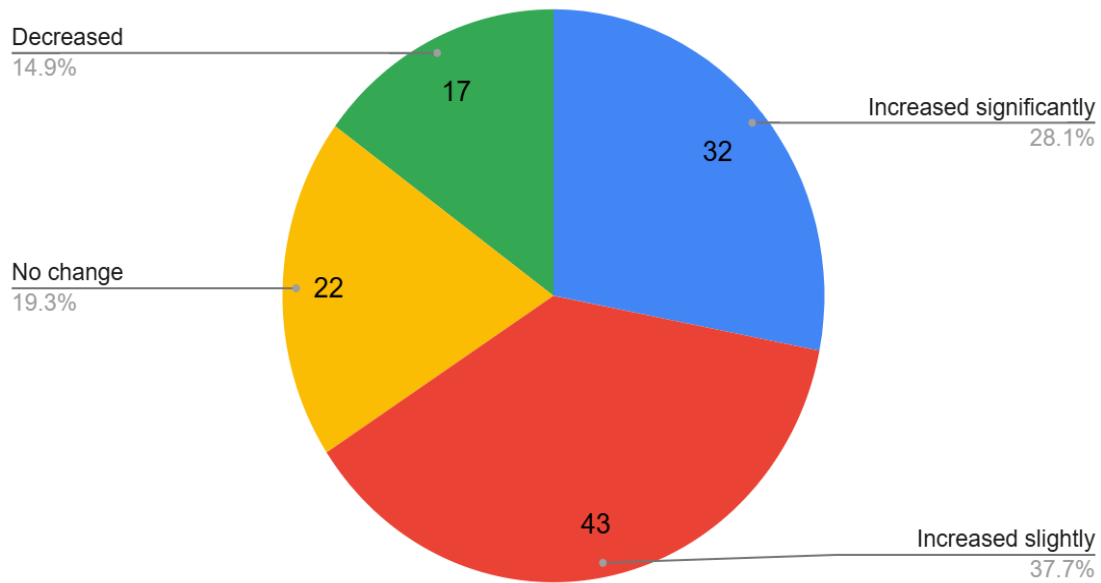


Figure 4. BBBP scheme's impact on educational enrollment in respondents' villages.

Retention Rate

How satisfied are you with the measures taken by the BBBP scheme to keep your children in school?

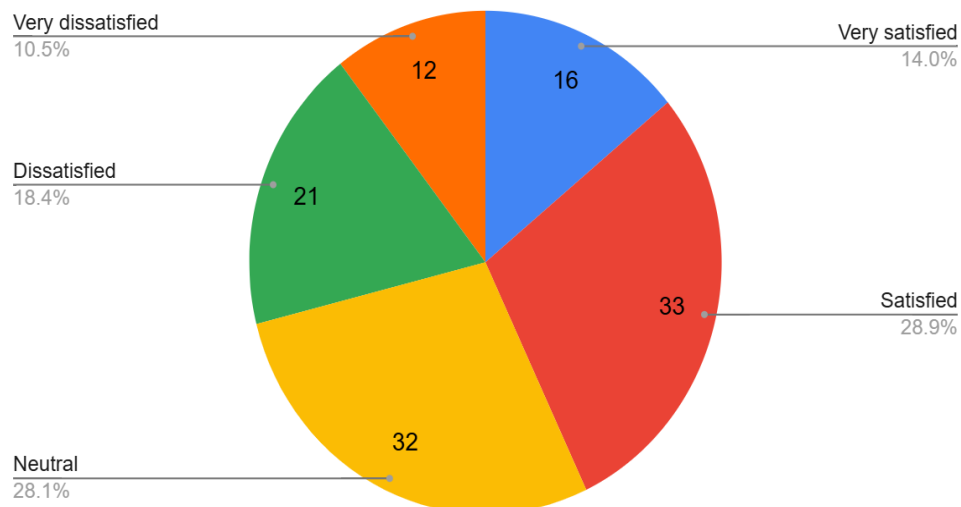


Figure 5. Respondents' satisfaction with BBBP measures for school enrollment.

Have you noticed a change in attendance since the implementation of the BBBP scheme?

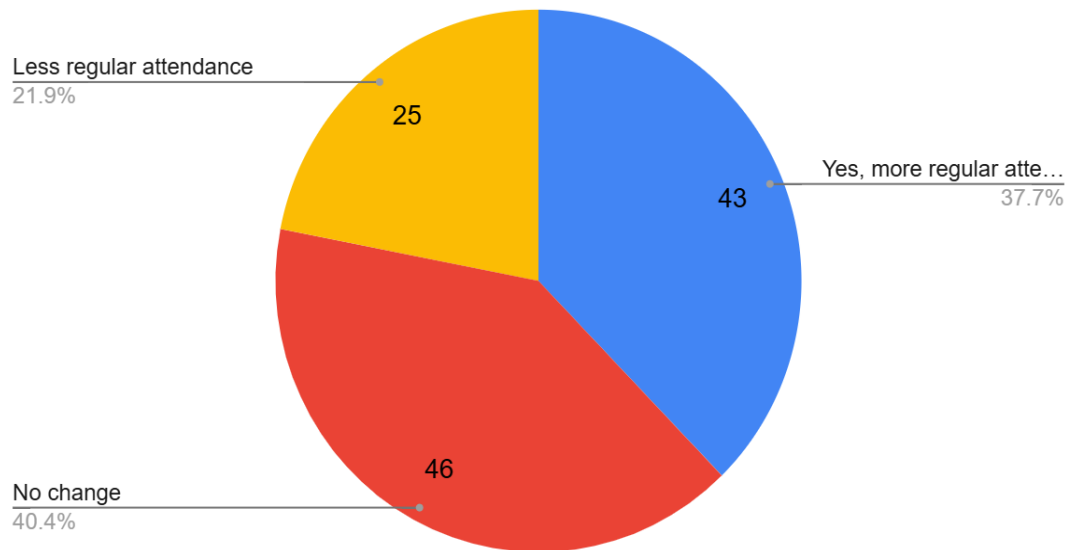


Figure 6. Impact of BBBP scheme on school attendance rates.

What is the main reason you want your child to stay in school?

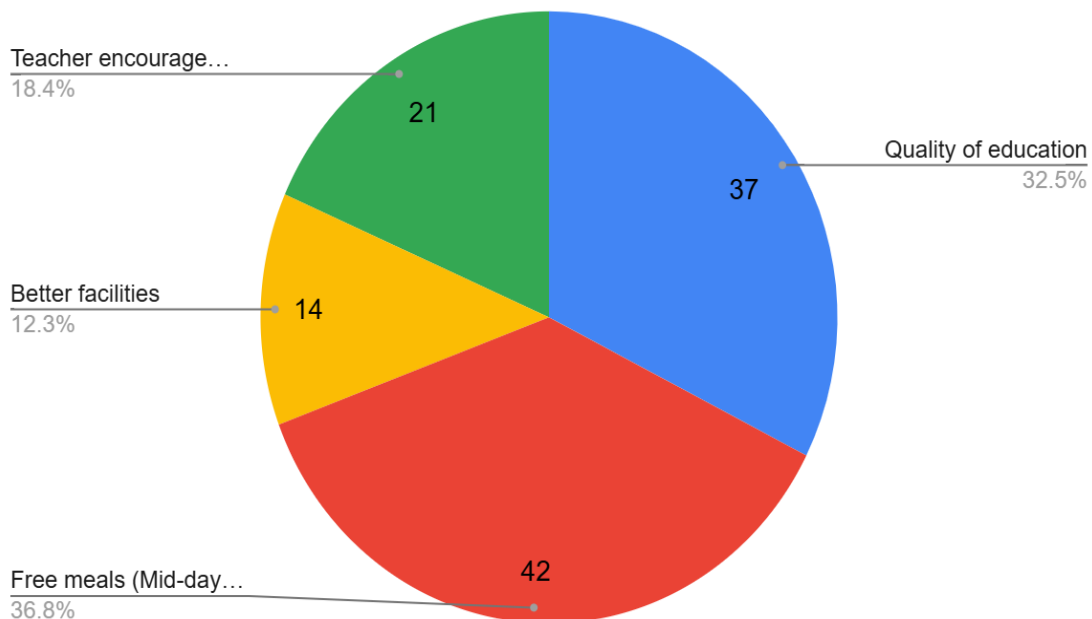


Figure 7. Respondents' reasons for keeping their children in school.

4. On a scale of 1-10, how likely are you to keep your children in school until they complete their education?

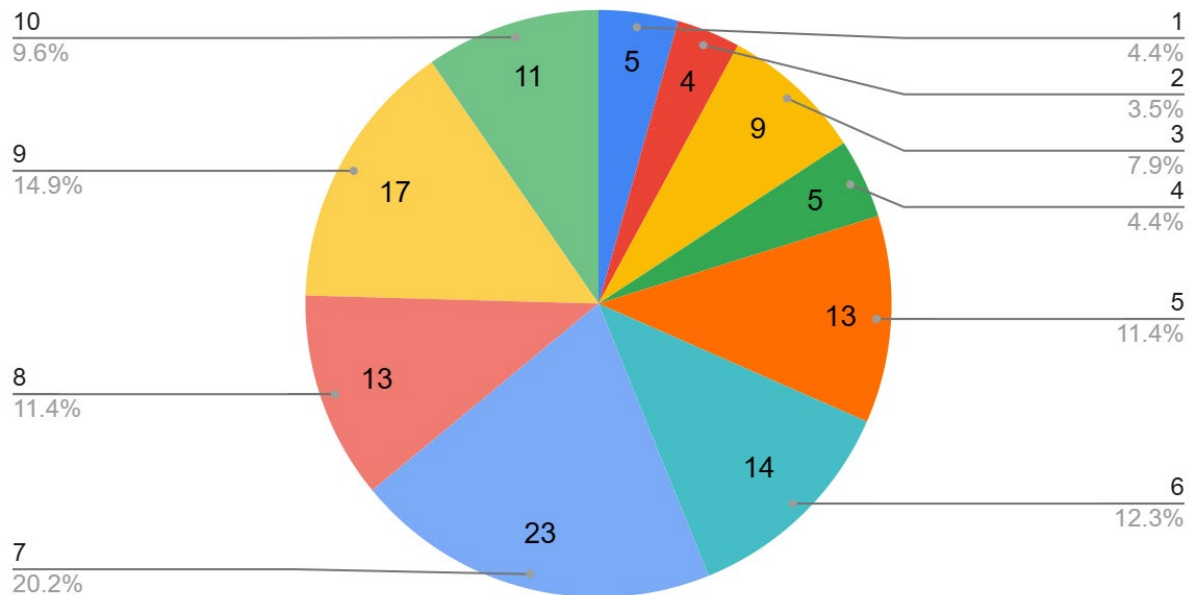


Figure 8. Respondents' likelihood of allowing their children to complete their education.

Quality of Education

How safe do you feel the school environment is under the BBBP scheme?

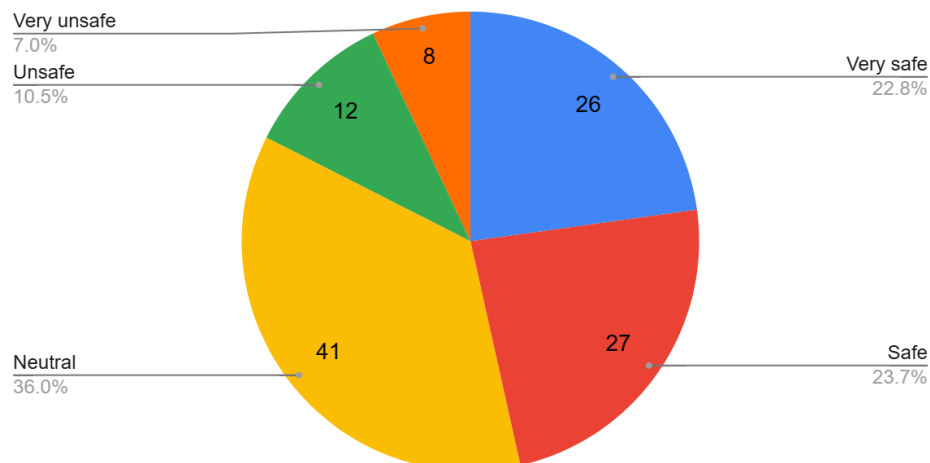


Figure 9. BBBP scheme's impact on safety in schools.

On a scale of 1-10, how would you rate the quality of education provided by the BBBP scheme?

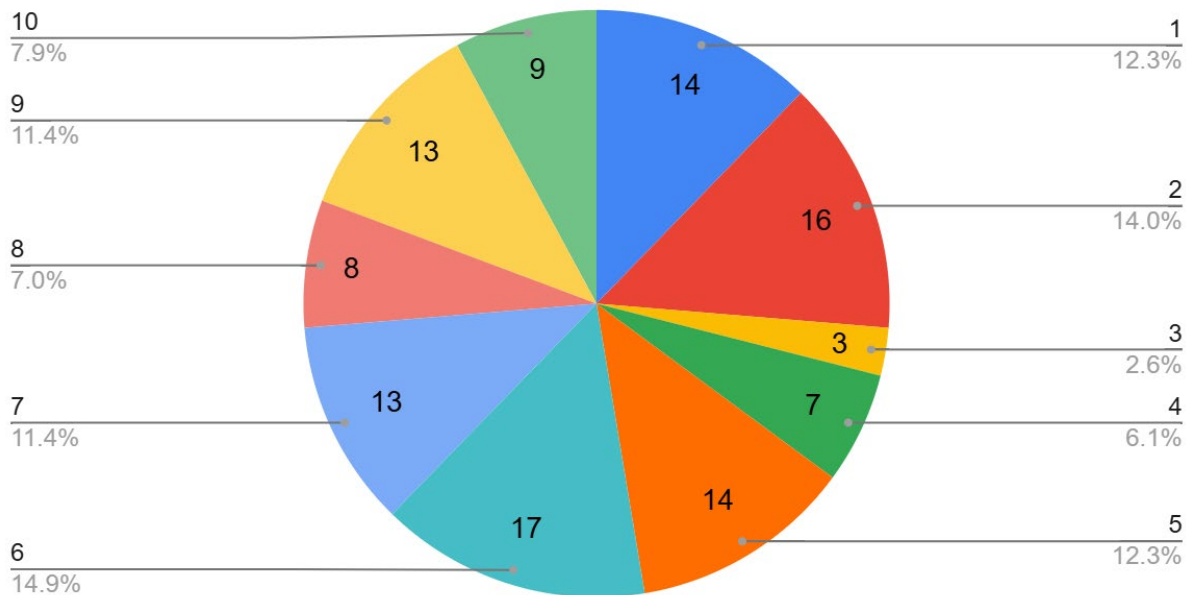


Figure 10. Respondents' belief regarding quality of education under BBBP scheme.

On a scale of 1-10, how confident are you in the overall benefits of the BBBP scheme for your children's future

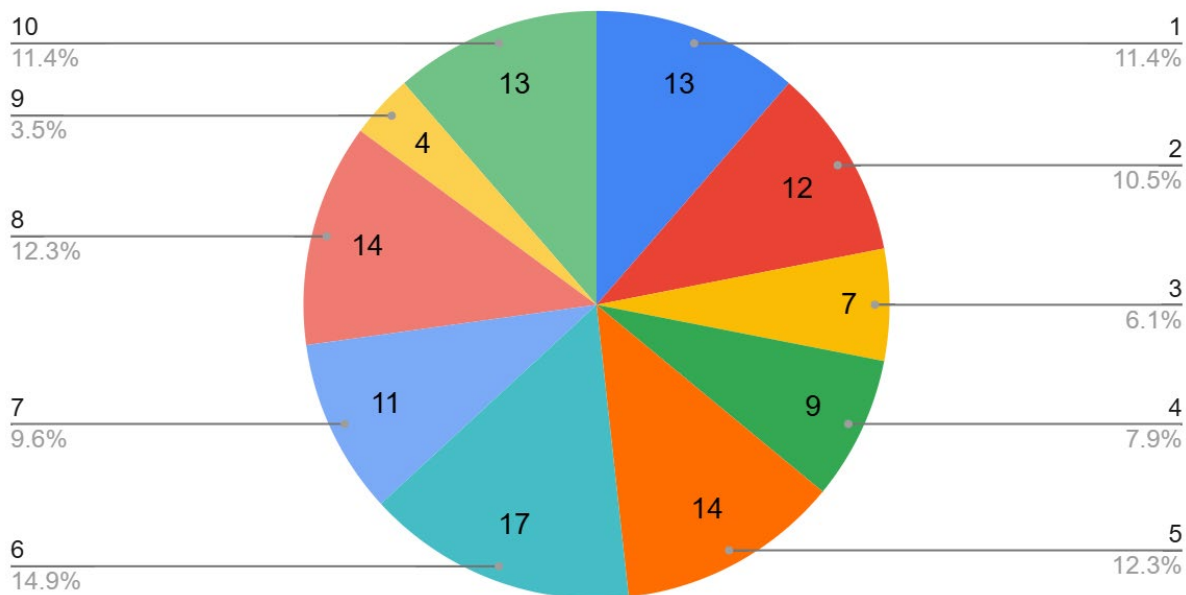


Figure 11. Respondents' belief of BBBP scheme's impact on childrens' future.

Literacy Rate

How has the BBBP scheme affected the overall literacy rate in your village?

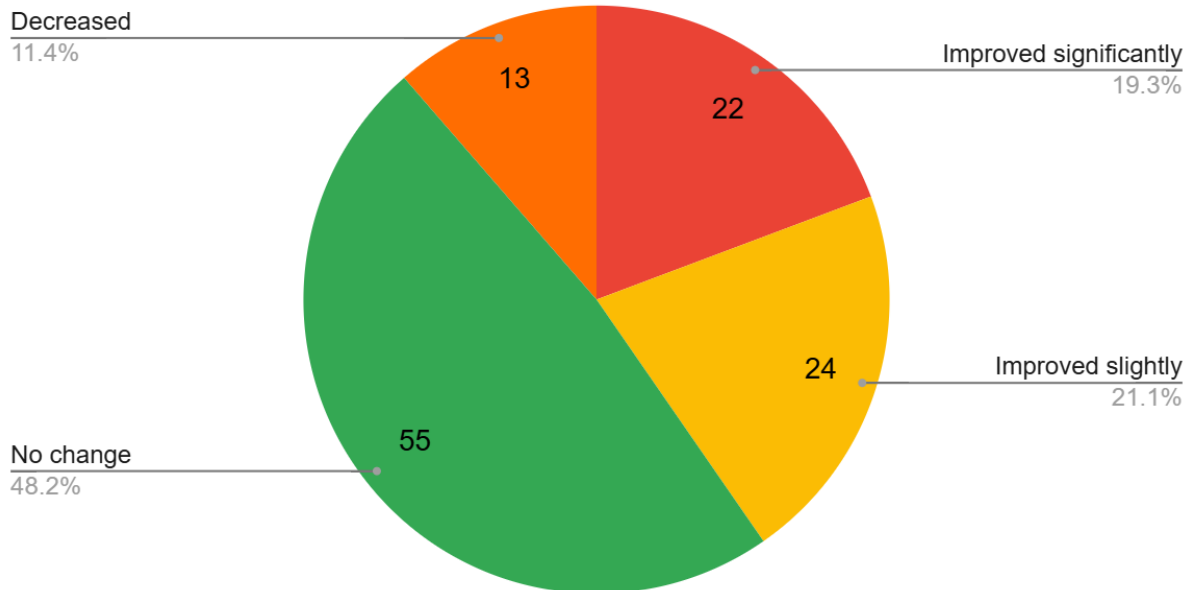


Figure 12. BBBP impact on overall literacy rate in villages

Discussion

Primary Research

Our results generally show a positive perception of the BBBP scheme in rural Madhya Pradesh, with a number of disagreements on the extent of its efficacy. Although we asked many questions, they required a degree of subjectivity due to the presence of rating-based questions (e.g., a 7 for one person might not be the same standard as a 7 for another person). Our results allow us to conclude that at least on the ground level in Madhya Pradesh, the BBBP has been successful in improving the quality and number of girl children getting educated. It has also assisted in changing the mindsets of people towards the education of the girl child. However, the extent to which this has happened remains to be seen. Our primary research certainly cannot confirm the efficacy of BBBP as respondents can simply be unaware, but its primary purpose was assessing the impact on the perception of girls' education in rural, traditionally conservative settings. However, a number of responses still indicate a lack of awareness around the BBBP and the extent of its application. Some responses even allow us to question whether the BBBP has been successful in achieving its goals, but we will leave such generalizations for more macro and secondary data.

Increase in Enrollment Rate

One of the primary goals of the BBBP campaign was to improve the participation of girl children in primary and secondary education—a constitutional requirement under the Right to Education Act of 2010. Our results show 63% of respondents said they were encouraged to enroll their child in school by the BBBP scheme. It is important to note the question wasn't whether the BBBP caused them to enroll their child, rather did it act as one factor, and if they enrolled their child before the BBBP, did it encourage them to let their child continue their education. This largely

allows us to conclude that in the Alirajpur district at least, the BBBP has largely been effective in the advertising aspect. This is particularly true also because the BBBP has not been able to invest in school infrastructure anyway, hence the advertising is probably what increased the enrollment rate—how efficient this is will be discussed later. Moreover, close to 66% of respondents believed the BBBP had a positive impact on enrollment rates, bolstering our previous argument. Moreover, when asked about factors affecting enrollment (multiple responses were allowed), close to 70% of respondents claimed advertising played a part, again supporting our argument. Even a reason such as community influence highlights the shift in mindset towards education, but the percentage being in the low 40s still indicates that schemes like the BBBP would need to be continued in the future. Responses related to financial assistance and improved facilities, however, are distant from the BBBP scheme and more a consequence of the MP state government's progress in the area—we will discuss the significance of this in the limitations of our research.

Increase in Retention Rate

The BBBP was not only about increasing enrollment but also ensuring the active participation of the girl child in inclusive development. This consequently involves the extent to which the girl child is allowed to pursue her education (retention rate). Now, of course, it is too early to make definitive comments on the complete impact on retention rates, as the scheme is likely to be continued for at least a decade. However, responses concerning retention rates can reveal information on the mindset of respondents towards the education of the girl child. Interestingly, 42% of respondents revealed they were very satisfied or satisfied with the provisions of the BBBP in terms of encouraging them to keep their child in school. This reveals a disconnect between the promotion aspect of the BBBP and actual ground-level improvements. So, while the BBBP has been successful in conveying why the education of the girl child is important, it has not been as successful in ensuring a greater retention rate on a practical level. Moreover, only 38% of respondents thought school attendance had increased as a result of the BBBP. This is particularly relevant when we question why this could be the case. A common reason for low levels of attendance of the girl child is that families believe the child offers more utility to the household by assisting in domestic work. Even if they want to educate the girl child, they fail to see how that will benefit the family's overall income. This thought process is one aspect the BBBP had aimed to eradicate, yet as we further got to know in informal discussions, it is something largely unaddressed. This highlights how even after the BBBP, female literacy is merely seen from a perspective of day-to-day convenience as opposed to an inherent capability-based human right—the patriarchal standards still persist. Moreover, when questioned on the main reason why they want to let their child stay in school (we did not include the importance of education as that is implied to be the main reason), the response that got the greatest number of answers, specifically 42 out of 114, was that in school, children are provided a mid-day meal by the government. This was even 5 responses higher than quality of education as a reason. This is particularly startling as it reveals the cost-benefit analysis families conduct when deciding to educate the girl child. A large reason for the requirement of the BBBP scheme was cultural norms in India, where a daughter is thought to cost the family more as they need to pay for her wedding, and she does not even earn any income. The overwhelming number of respondents stating the midday meal as a reason shows how these families feel that by sending their daughter to school, they can save on the cost of a meal, suggesting a less-than-ideal mindset about education. However, close to 80% of respondents said they were more likely to allow their daughter to continue education, suggesting that for whatever reason it may be, female literacy rates and enrollment in higher education are likely to increase.

Improvement in Quality of Education

A common criticism leveled against the BBBP is that although it has enhanced enrollment and retention rates, the actual quality of education provided still remains much below the ideal standard. Schools still lack facilities and teachers, some even questioning the qualifications of the teachers. Now here, our research can provide insights but cannot be enough to make definitive claims about the quality of education provided—simply put, an average respondent cannot comment on the quality of education in an academic manner. Close to half of the respondents claimed that the BBBP had created an increased sense of safety within the school environment, indicating a greater degree of

acceptance of girl children in education and perhaps even a step towards facilitating inclusivity. Moreover, close to 53% of respondents expressed positive views on the quality of education provided (rated between 6-10). This suggests that even if the actual quality of the education provided hasn't improved significantly, at least the perception of it has. As our previous section showed us, the quality of education was a motivating factor towards higher retention rates; hence, the perception of a higher quality education, even if not true, can bolster literacy rates. No significant improvements in the quality of education are not ideal; however, any education is better than no education. Moreover, interestingly, 52% of respondents expressed positive views (rated 6-10) on the benefits of the BBBP for the future of their child. This indicates to an extent that parents are viewing the education of the girl child as possibly even lucrative from a financial perspective, suggesting a shift from the traditional roles assigned to women in Indian society, in the sense that even women are seen as possible contributors to the family income. However, it could also be a consequence of the BBBP raising awareness around the importance of education in a more social light, such as better hygiene, political decision-making, etc. Since our research does not attempt to prove a causal link, this discussion is merely speculative based on our observations.

Literacy Rate

Analysis on literacy rates should ideally be reserved for a longer time frame as the BBBP primarily attempts to encourage the primary schooling of girl children. However, the answers given by respondents indicate a more supportive approach towards the education of girl children. Only 10% of respondents felt the literacy rate for girl children had increased, with close to 40% of respondents saying it increased and the rest stating it remained the same. Even if the literacy rate did not increase, it highlights that in the future, it is likely to increase. Moreover, since the number of enrollments also increased, our results generally seem accurate here as well. Furthermore, on a psychological level, it shows a desire on the part of the respondents to see an improvement in the literacy rate—a testament to the success of the promotion aspect of BBBP.

Secondary Research

Increase in Enrollment Rate

The 2nd and 3rd goals of the BBBP focus primarily on boosting the enrollment, retention, and literacy rates of the girl child. The scheme was started by the Ministry of Health and Family Welfare in collaboration with the Ministry of Women and Child Development and the Ministry of Education. The approach of the scheme was to promote the education of the girl child as opposed to actually increasing expenditure significantly on the provision of education—a source of much controversy. Between the years 2015-2021, the enrollment of girls into secondary education has increased by 3.95% to close to 80% (Yash, 2022). However, this figure includes even urban areas; this number is much lower for rural areas, closer to 65% (Livemint, 2023). Moreover, in 2010, the Right to Education Act was introduced as part of the constitution; hence, whether the increase in enrollment is a consequence of the act or the BBBP remains to be seen and is much beyond our scope. However, the BBBP has promoted a number of financial incentives, such as free textbooks, scholarships, and uniforms, which in an economic sense are likely to boost enrollment rates (ISPP, 2023). Even the Sukanya Samridhi Yojna, by allowing a tax-free compound account, makes it fiscally feasible for parents to afford higher education for the girl child (ISPP, 2023). Even from the perspective of health, the scheme has allowed the provision of sanitary napkins and a redesign of the mid-day meal to increase nutrient content—all factors encouraging increased enrollment.

Increase in Retention Rate

Closely related to enrollment rates, retention rates directly impact the quality of one's schooling but also their level of literacy. The scheme, although not responsible for the making of new schools, has allowed infrastructure improvements to be made to pre-existing schools, specifically to improve retention rates. Separate toilets have been built for girls and boys in over 10,000 schools in the country (Arora, 2022). The provision of proper sanitation is essential to

health, an important challenge of rural poverty, and a direct contributing factor to the number of years spent in school. Even the increase in female teachers (40% since the scheme started) has created a safer, more accommodating environment for female students, challenging the notion that only boys should be educated—even CCTVs have been installed in some states (Arora, 2022). Retention rates, as the Ministry of Women and Child Development has noted, have also been affected by the media campaign run under the scheme (PIB Delhi, 2022). The media campaign has made the education of the girl child important in the public conscience; hence, its denial is seen as an immoral act—precisely what the RTE was also getting at. Hence, beyond the encouragement to allow secondary education for the girl child, what the scheme has been able to do is fundamentally change the mindset possessed by individuals regarding the education of the girl child. It is no longer an option; it is rather an inherent right.

Literacy Rates

The BBBP was never started with the goal of lifting the literacy rate in the short run. Yet today, it is 6% higher than it was in 2011 (National Portal of India, 2021). The BBBP can obviously not be credited with this in its entirety; however, the approach of the BBBP to enhance female literacy is notable. The BBBP primarily aims to change the perception around the importance of the girl child in patriarchal Indian society. Hence, it first starts with improving the CSR in regions where such misogynistic mindsets are prevalent. After which, it aims to maximize the enrollment of girl children into primary education, equalizing the gender gap. Hence, the BBBP differs in its approach as a policy intervention because unlike simply providing education, it aims to address the root cause. The root cause of gender inequality is simply the prevalent social, religious, and economic mindsets. Regardless, whether or not the BBBP scheme actually increases female literacy remains to be seen and is much beyond our scope.

Quality of Education

We have extensively discussed enrollment rates and retention rates; however, we have ignored the actual quality of the education being provided. For example, when Amartya Sen discussed the building up of capabilities as development, he emphasized the importance of having the right abilities (Gasper, 2023). One can be able to read and write, but to what level they can do so is equally important; the better question would instead be if the education provided allows the girl children to reach their maximum potential. As Abhijit Banerjee pointed out, this is not the case in India, where the literacy rate does little to comment on the quality of education (Banerjee et al., 2010). It is predicted that the academic ability of a student living in rural areas is on average three grades below their age (Banerjee and Duflo, 2011). The BBBP has for the most part left discussions on the quality of education unaddressed. Teachers have been more sensitized to make a more inclusive environment, along with the inclusion of gender studies in the curriculum, but largely the criticisms of the system still exist. The over-allocation of the budget of the scheme to media and advertising has also caused the actual quality of education to be ignored. This improvement in quality does not necessarily mean expensive education; it simply means focusing more on the relevant academic skills. This can be improved by teacher training and a more comprehensive curriculum. In short, it requires ingenuity from policymakers, but leaving it unaddressed is a cause of concern.

Inefficient Budgeting and Management

Beyond the aspect of policymaking, the implementation of the policy itself has seen various objections. Between 2015-2018, close to 368 crores were allocated by the central government to state governments to implement the scheme (Chandra, 2021). 291 crores of this were actually released to the states (Chandra, 2021). Yet still, only 20% of these funds have actually been spent (Chandra, 2021). This is either a consequence of inefficient budgeting or the prevalence of corruption within state ministries. Regardless, the efficacy of the scheme is nowhere close to what was previously envisaged as the funds are being ineffectively utilized. Even if the funds have not fallen prey to corruption, the inertia by states threatens to worsen the inequality the scheme attempts to resolve. The question we must thus ask is why is this money not spent? And where will it be spent?

The inefficiency in the process is not only due to delayed expenditure but also where the funds are allocated. 47% of the total 703 crores allocated under the scheme was spent on communication and media, compared to only 5% on education (Nikore, 2019). A scheme driven to improve the position of the girl child in society seems to care more about messaging than actually working towards the issue it set out to solve. Now, it is true that the campaign aimed to address the root cause; however, at least in the short run, actively providing high-quality education is required for long-term sustainability. You can change the mindset of the people as much as you want; however, if there are no actual improvements in various indicators of female development, then the process itself loses its relevance in the long run. The scheme might have had a great intangible impact on mindsets, however, has done little to enhance development in a physical sense. If the purpose of BBBP was not to do this, then the involved ministries must also find a complementary scheme as well—as it stands, BBBP is not enough to enhance the education of the girl child. Moreover, even on the district level, insufficient monitoring and oversight have cost the scheme close to 70 crores (Nikore, 2019), hence greater transparency and accountability are mandated.

State-Wise Comparison

Although the BBBP was initially meant for 100 districts with the lowest CSR, it has expanded to become a nationwide policy covering all 640 districts after its initial success (PIB Delhi, 2018). The scheme is managed at the national level by the Ministry for Women and Child Development (MoWCD); the Ministry of Health and Family Welfare (MoHFW), and the Ministry of Human Resource Development (MoHRD). At the state level, each state's respective department is responsible for the coordination and implementation of the scheme, and District Collectors are responsible for the implementation at the district level. Comparing the effectiveness of the scheme across states in the context of education is important to identify successful methods, and room for improvement.

The study mentioned in the literature review conducted by the National Council of Applied Economic Research, "An Evaluation of India's Beti Bachao Beti Padhao Scheme" provides some state-wise educational data from surveys conducted in different zones. Central Zone included Madhya-Pradesh and Chhattisgarh; East Zone included Bihar and Odisha; North Zone included Haryana and Himachal Pradesh; North-east Zone included Assam, Manipur, and Nagaland; South Zone included Andhra Pradesh, Kerala, Tamil Nadu; West Zone included Goa and Rajasthan. 96.3% of respondents on the whole wanted to enroll their daughters for Secondary Education (ISPP, 2023). When compared by zone, the South led with 100%, followed by the Central and East Zones with 97.9%. Interestingly in the North-east Zone, 100% of respondents wanted to enroll their daughters for secondary education but only 79.2% wanted to in Manipur, the only figure below 90% across all states (ISPP, 2023). This demonstrates that although sentiments towards the girl child may have commonalities when divided by broader zones, the individual intervention and implementation of the scheme by each state plays a crucial role in changing attitudes. The state-wise data from the survey conducted of Senior Secondary schools reveals that the availability of separate toilets for girls is crucial in ensuring enrolment and attendance. The South-zone had the highest average number of female toilets per school (9.8), whereas the North-east zone had the lowest (1.7) (ISPP, 2023). This discrepancy is reflected in the difference in secondary enrolment desire seen previously.

In the same study, the state-wise comparison of activities taken by schools to encourage enrolment, retention, and completion of secondary schooling for girls shows that in most zones, at least 80% of the schools are undertaking the required activities (ISPP, 2023). But this is not the case in the North-east zone, where less than 50%, and in some cases even less than 35% of schools undertake the required activities (ISPP, 2023). When compared with the North Zone (Haryana and Himachal Pradesh), which initially had some of the lowest CSR ratios, it is seen that most activities are being undertaken by all schools (ISPP, 2023). Clearly, state-wise implementation of the same centralized policy varies across zones, and subsequently has different success levels. The state-wise data indicates that transportation is the biggest constraint for secondary school enrolment, followed by school uniform, escorts for safety, care of siblings, and toilets.

Harvard University's Geographic Insights Lab and India Policy Analysis Team compared data from the National Family Health Survey (NFHS 2019 - 2021) and NFHS (2015-2016) to evaluate the performance of the BBBP across states and districts (NFHS Policy Tracker for Districts, n.d.). They do so by creating a Key Performance Indicator (KPI) index, ranking states and districts by their performance in these indicators. The ranking data shows that Kerala, Goa, and Mizoram were the highest-ranking states, while Bihar, Jharkhand, and Nagaland were the lowest ranking states (NITI Aayog, 2022). Haryana and Uttarakhand were the most improved states, going up 10 and 8 ranks respectively. Meghalaya and Tripura fell the most rankings, 9 and 7 respectively (NITI Aayog, 2022). The paper explains that there are wide inter-state and inter-district performance variations in terms of the BBBP. This could possibly be due to varying performances in budget usage and efficiency, or differences in the meticulousness with which the policy's guidelines are followed. For example, as seen in the literature review, various implementation challenges in Haryana and Punjab existed. The India Policy Insights study believes that the Union government should provide extra support to states with lower performing KPIs (NITI Aayog, 2022.).

Conclusion

The Beti Bachao Beti Padhao Scheme started by the Indian government in the year 2015 with the goal of reducing gender-based inequality in India has had a number of impacts on the education and survival of the girl child in India. Whilst the improvements in the CSR ratio are evident, the extent of the impact it had on the education of the girl child has not been adequately researched. The purpose of our research was to analyze the effectiveness of the policy in this context whilst pointing out areas for improvement. Moreover, we aimed to analyze possible directions future policies can take to facilitate inclusive development. We did so by analyzing both our primary data for a rural level picture and secondary data for a more national one. To achieve the research objective, we surveyed 114 households in the Alirajpur district in Madhya Pradesh. The region was chosen due to its diverse socio-economic background and history of being an unequal state in terms of gender. Cluster sampling was used to ensure a representative sample, and each household was manually surveyed due to the lack of flexibility of an online survey method. Further, secondary data and literature were also evaluated. Of the survey respondents, 89.47% were very or somewhat aware of the scheme and 63.16% indicated that it encouraged them to enroll their children in school, with financial assistance and scheme publicity being the primary motivators. 40.35% of respondents believed that the scheme improved the overall literacy rate in their village. Over half of the respondents reported noticeable improvements in the quality of education. However, retention and attendance rates did not see a significant increase. Nonetheless, increased safety in schools for girls was noted as another benefit of the scheme. Evidently, education has improved under the scheme, but secondary data indicated a lack of administrative and budget efficiency and an undue focus on publicity rather than tangible educational improvements. Only 4% of the budget of the scheme has actually been spent on education, leaving the 3rd goal largely unaddressed (Nikore, 2019). Whilst the scheme has been able to alter individual mindsets to a substantial degree- our primary research confirms this- a lot is left to be desired in terms of the physical provision of high-quality education for girl children. This study focuses on an uninvestigated performance measure of the BBBP, uses a targeted sampling method, and evaluates a variety of secondary data. However, the survey was geographically limited, and the self-reported nature of the data from the survey may have underlying biases. Neutral framing of questions was used to limit this bias. This study indicates that a broader, nationwide survey, or surveys in other states, is a logical step for further research into the effectiveness of the scheme. Further, a focused investigation into the budget efficiency of the scheme could be beneficial. Lastly, our survey is unable to accurately quantify the exact impact of the BBBP on the state of the education provided to the girl child. It is possible we see a largely exaggerated impact with improvements being derived from other schemes and projects by the government (confounding variables). Hence, we cannot single out the effect had by the BBBP scheme, leaving room for a detailed cause-effect study.

Limitations

Our research, although insightful, has a number of limitations. Firstly, of course, the sample size—a sample of 114, although enough to reduce the incidence of skewed responses, is not a completely accurate representation of the views of the population; there still exists a margin of error. Moreover, since our identities while interviewing were not anonymous, it is possible respondents answered in a way they thought we would prefer. However, we had urged them to be as honest as possible and that we had no prior opinion on the scheme. Moreover, in the 1-10 rating answers, an overwhelming number of respondents answered with the number 7. This is a well-documented phenomenon and a limitation with the design of our questions. At its most extreme, it can actually disguise the true opinion of respondents. Moreover, the research suffered from voluntary response bias as a number of those we selected refused to participate—palpably those with more extreme views. Moreover, our analysis is unable to quantify the extent to which these results are affected by the BBBP. There exist several other confounding variables, such as state and central government education provisions beyond the BBBP, that could have influenced the same. Hence, our lack of ability to prove a causal link undermines our ability to quantify the efficacy of BBBP.

Until now, we have discussed extensively the results of our primary research and the implications of pre-existing research. In this section, we will use data collected by other researchers to evaluate the success of the policy in boosting girl child education in India. We will expand upon the arguments provided by other researchers, contextualizing them in terms of our research question. Much like our questionnaire, we have divided this section into six sub-categories we will analyze individually.

Acknowledgments

We would like to thank our Economics teachers Ms. Rashmi Baruah and Ms. Shama Sheikh for guiding us through the process of academic writing and providing us with feedback on our drafts. We would also like to take this opportunity to thank the respondents who participated in our survey and answered diligently according to the needs of the questions.

References

- Arora, A. (2022, October 19). “Beti Bachao, Beti Padhao” scheme: A critical analysis. Orfonline.org. <https://www.orfonline.org/expert-speak/beti-bachao-beti-padhao-scheme>
- Bachao, B., Padhoa, B., Bhat, B., Ud, G., & Qurashi, D. (2019). <https://doi.org/10.31426/ijamsr.2019.2.3.1313>
- Banerjee, A. V., Banerji, R., Duflo, E., Glennerster, R., & Khemani, S. (2010). Pitfalls of Participatory Programs: Evidence from a Randomized Evaluation in Education in India. *American Economic Journal: Economic Policy*, 2(1), 1–30. <https://www.jstor.org/stable/25760049>
- Beti Bachao Beti Padhao : Achievements and Progress. (n.d.). Pib.gov.in. <https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1523059>
- Chandra, J. (2021, December 10). Beti Bachao, Beti Padhao | 80% of funds spent on media campaigns, says Parliamentary Committee. *The Hindu*. <https://www.thehindu.com/news/national/beti-bachao-beti-padhao-whopping-80-of-funds-spent-on-media-campaigns-says-parliamentary-committee/article37922778.ece>

Chandra, J. (2021, December 10). Beti Bachao, Beti Padhao | 80% of funds spent on media campaigns, says Parliamentary Committee. The Hindu. <https://www.thehindu.com/news/national/beti-bachao-beti-padhao-whopping-80-of-funds-spent-on-media-campaigns-says-parliamentary-committee/article37922778.ece>

Chouhan, K., Pareek, S., & Sharma, R. (2022). Knowledge and attitude regarding “Beti Bachao, Beti Padhao Yojana” among young and aged rural adults: A cross-sectional study. *Journal of Datta Meghe Institute of Medical Sciences University*, 17(2), 350. https://doi.org/10.4103/jdmimsu.jdmimsu_275_20

Devi, R., Gupta, S., & Verma, M. (2021). Awareness of women regarding Beti Bachao and Beti Padhao scheme. ~ 181 ~ *International Journal of Home Science*, 7(2), 181–183. <https://www.homesciencejournal.com/archives/2021/vol7issue2/PartC/7-2-57-998.pdf>

Gasper, D. (2023). Amartya Sen as a social and political theorist – on personhood, democracy, and “description as choice.” *Journal of Global Ethics*, 1–24. <https://doi.org/10.1080/17449626.2023.2255600>

George, N., Britto, R., Abhinaya, R., Archana, M., Aruna, A. S., & Narayan, M. A. (2021). Child sex ratio - declining trend: Reasons and consequences. *Indian Journal of Child Health*, 8(10), 349–351. <https://doi.org/10.32677/ijch.v8i10.3091>

Girl enrollment rises at secondary school level, but drops at primary and upper primary level, reveals study. (2024). *Indiatracker.in*. <https://www.indiatracker.in/story/girl-enrollment-rises-at-secondary-school-level-but-drops-at-primary-and-upper-primary-level-reveals-study>

Government of Karnataka, Karnataka Evolution Authority, Karnataka State Akkamahadevi Women’s University, Sunandamma, & Kakade. (2020). AN EVALUATION OF “BETI BACHAO BETI PADHAO” SCHEME IMPLEMENTED IN VIJAYAPURA DISTRICT IN KARNATAKA STATE . In *kmea.karnataka.gov.in*. <https://kmea.karnataka.gov.in/storage/pdf-files/Reports%20and%20other%20docs/Beti%20Bachao%20Report.pdf>

Government of Madhya Pradesh. (2000). Population Policy of Madhya Pradesh Department of Health and Family Welfare Government of Madhya Pradesh. https://www.mp.gov.in/uploads/policy/MP_Population_Policy.pdf

India Brand Equity Foundation. (n.d.). Beti Bachao, Beti Padhao (BBBP) Scheme | IBEF. *Www.ibef.org*. <https://www.ibef.org/government-schemes/beti-bachao-beti-padhao>

India Policy Insights | NITI Aayog. (n.d.). *Www.niti.gov.in*. Retrieved August 1, 2024, from <https://www.niti.gov.in/india-policy-insights>

ISPP. (2023, July 10). Evaluation Summary Beti Bachao, Beti Padhao | ISPP. *Www.ispp.org.in*. <https://www.ispp.org.in/evaluation-summary-beti-bachao-beti-padhao-2015-2022/>

Jagran Josh. (2013). <https://www.jagranjosh.com/general-knowledge/madhya-pradesh-literacy-rate-as-per-census-2011-1372399333-1>. *Jagranjosh.com*. <https://www.jagranjosh.com/general-knowledge/madhya-pradesh-literacy-rate-as-per-census-2011-1372399333-1>

Jaiswal, R., Sinha, A., Dhawan, P., Sundar, R., Alawadhi, A., & Rangarajan, V. (2020). An Evaluation of India’s Beti Bachao Beti Padhao Scheme AE C R N August Report. https://www.ncaer.org/wp-content/uploads/2020/08/1611336563NCAER_BBBP_Scheme_Report_August_2020.pdf

Joshi, K., & Bora Sharma, N. (n.d.). IMPORTANCE OF GIRL CHILD EDUCATION IN INDIA IMPORTANCE OF GIRL CHILD EDUCATION IN INDIA.

Livemint. (2023, March 15). Indian women's literacy rate increased by 68% since Independence: Report. Mint. <https://www.livemint.com/news/india/womens-literacy-rate-increased-by-68-since-independence-report-11678863594186.html>

Ministry of Women And Child Development In Partnership With The Ministry Of Education and UNICEF Launches Campaign 'Kanya Shiksha Pravesh Utsav' To Bring Back Out of School Adolescent Girls To The Formal Education. (2022). Pib.gov.in. <https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1803748>

NFHS Policy Tracker for Districts. (n.d.). Geographicinsights.iq.harvard.edu. <https://geographicinsights.iq.harvard.edu/nfhs-tracker-districts>

Nikore, M. (2019, January 3). Beti Bachao Beti Padhao – A critical review of implementation. Times of India Blog. <https://timesofindia.indiatimes.com/blogs/irrational-economics/beti-bachao-beti-padhao-a-critical-review-of-implementation/>

Nikore, M. (2019, January 3). Beti Bachao Beti Padhao – A critical review of implementation. Times of India Blog. <https://timesofindia.indiatimes.com/blogs/irrational-economics/beti-bachao-beti-padhao-a-critical-review-of-implementation/>

O'Hearn, D. (2009). Amartya Sen's Development as Freedom: Ten Years Later | Development Education Review. Developmenteducationreview.com. <https://www.developmenteducationreview.com/issue/issue-8/amartya-sens-development-freedom-ten-years-later>

Pareek, A. (2021). Effectiveness of India's National Program to Save the Girl Child: Experience of Beti Bachao Beti Padhao (B3P) Program from Haryana State. The Journal of Contemporary Issues in Business and Government, 27(3), 614–320. <https://cibgp.com/au/index.php/1323-6903/article/view/1640>

Profile - Literacy - Know India: National Portal of India. (n.d.). Knowindia.india.gov.in. <https://knowindia.india.gov.in/profile/literacy.php>

Rana, T. (2024, April 8). Has Beti Bachao Beti Padhao's Media Advocacy Focus Achieved The Desired Outcomes? BehanBox. <https://behanbox.com/2024/04/07/has-beti-bachao-beti-padhaos-media-advocacy-focus-achieved-the-desired-outcomes/>

Saini, V., & Sangwan, S. (2018, January 18). Awareness on Gender Empowerment and Beti Bachao Beti Padhao Through Intervention. Ssrn.com. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3116715