



## HOUSEHOLDS' FUEL WOOD DEPENDENCE, REDD+ AND GENDER COPING STRATEGIES: AN EMPIRICAL REVIEW AND POLICY IMPLICATION IN THE NORTHERN REGION OF GHANA

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### Abstract

This paper reviewed existing literature on fuel wood dependence, REDD+ and gender coping strategies. Out of 180 sets of empirical studies in this domain, twenty five (25) were considered to have a bearing on our topic. The review showed that REDD+ policy in the Northern Region has not provided for REDD+ finance to curb the possible negative effects of the implementation of the programme. It is recommended that there should be a clear cut policy on REDD+ finance for those who depend on the forest. It is also recommended that there should enough public education for communities' acceptance and integration.

Keywords: Fuel wood Dependence; REDD+; Gender Coping Strategies; Time Poverty

## **Introduction**

More than half of all wood harvested from the forest are used for energy (FAO 2000). Knight and Rosa (2012) argued that about 75% of wood harvested are for fuel. Fuel wood as a form of energy has been used mainly for cooking and heating in developing countries (Pearce, 2000). In some rural communities, animal dung and crop residues have been used as substitutes for fuel wood. In a more recent study, Kapinga (2015) indicated that majority of households who depend on the forest for their livelihood are from the rural peripheral of the developing countries and this has led to deforestation as a common feature. The urban centers on the other hand have served as market channels for fuel wood and this appears to have aggravated and fueled high fuel wood dependency rate. The use of fuel wood, animal dung and crop residues suggest that some communities in the developing world encounter acute energy poverty.

Increases in human population also increase household size and this leads to increase in fuel wood dependence in many developing countries. The majority of these households who depend on the forest for their livelihood are from the rural peripheral of the developing countries and this has led to deforestation as a common feature (Kapinga, 2015). The urban centers in developing countries have served as market channels for fuel wood demand and thus aggravate and fuel high dependency rate. Knight and Rosa (2012) further explained that, household size has become a dominant issue in socio-ecological literature because of the important role demographic variables play in any societal set up.

At the global level, attempts have always shifted to reducing energy poverty for developing countries. This is explained to mean, the amount of energy that the poor people in developing countries require to enhance their lifestyle and reduce health implications. Birol (2004) reported that, the global level energy demand has been approximated to be 1.7 % per year with 2000 as a starting year and projected to 15.3 billion by 2030. Apparently, developed countries usage of traditional energy is below 2%, but 46% for South Asia and over 53% for Sub-Saharan Africa (Mishra, 2003).

The dependence on fuel wood as a form of traditional energy will not be gone anytime soon. This is because, there are several drivers that influence demand for this form of energy and households will always make the easiest choice as long as there is availability of fuel wood. Rehfuss (2006) reported that, the foremost users of fuel wood are the women in developing countries and for that matter Ghana and Northern Region are exception. The dependence on fuel wood as a traditional energy comes with health implications for women. Mishra (2003) explained that, women and young children are the very people who are affected most in terms of health (indoor exposure to combustion products of unsolid fuels) from the by-product of traditional energy. A World Bank's (2011) study related by Kohlin et al (2011) explained that, approximate estimates of three billion people still depend on solid fuels and that, women and children are mainly affected by indoor air pollution resulting from solid fuel usage.

Fuel wood scarcity has a threat on women and subsequently on environmental sustainability. In many occasions, women and young children spend several hours in search of fuel wood for cooking (Mishra, 2003). This increases a phenomenon called

“Time Poverty”, a situation in which women have inadequate time to carry out all their required tasks as they wish to undertake. The Millennium Ecosystem Assessment (2005) noted that, global conservation and sustainability of forest lies in integrating economic and ecological sciences into decision regarding forest management and thus helps the ecosystem services.

Therefore, dependence on the forest for fuel wood has raised issues with deforestation and environmental degradation. IPCC (2007) explained that, when the forest is degraded and deforested, they provide an impetus for climate change. The climate change situation is manifested when trees can no longer absorb and store terrestrial carbon in their roots, branches and leaves; a process known as carbon sequestration (Kapinga, 2015). Population in Africa is increasing and the same is applicable in Ghana and Northern Region. The growth in population growth is likely to be associated with: a higher than the global average degree of change, high levels of dependence on natural resources and forest goods and services, and a low degree of adaptive capacity (Eastaugh, 2010 cited in Kapinga, 2015).

As a result of the devastating effects and long term anticipated effects of climate change, the United Nations Framework Convention on Climate Change (UNFCCC) advocated and adopted Reducing Emissions from Deforestation and Forest Degradation (REDD+) as a way to mitigate climate change impact. The adoption of climate change mitigation initiative has major elements including reducing emissions from deforestation and forest degradation and forest conservation; sustainable management of forests; and enhancement of forest carbon stocks (Stephenson, 2011 cited in Kapinga, 2015).

The adoption of the REDD+ strategy at the global level is a form of Social protection aimed at reducing vulnerability in developed and developing countries. The extent of vulnerability among inhabitants in developing countries is felt by populations dwelling in rural areas along with those reliant on ecosystems for their livelihoods anytime there are global shocks (rise in food prices, financial and debt crises, and climate change) and are continually exposed to multiple local risks and shocks including natural disasters, disease and income losses (Davies et al 2013 cited in Tirivayi and Rodriguez, 2014). Tirivayi and Rodriguez (2014) showed that interaction between social protection and forestry has an element of both synergies and conflicts and therefore both can substantially contribute to poverty reduction and the improvement of livelihoods. The Government of Ghana has recognized the contributions of the forest in terms of income and livelihood of rural people and impact of any policy on Ghanaians.

Gender role in Ghana has been identified as a major influential factor on REDD+ strategy implementation to ensuring social and environmental safeguards are adhered to, at all levels. At the same vain, provide an avenue to mitigate the negative impact of such policies on the disadvantaged/vulnerable groups in society, particularly women (GOG, 2015).

Ghana adopted a Gender and REDD+ Road Map to enhance gender mainstream considerations into the forestry sector, while providing adequate attention to REDD+ processes. This in the view of Government would offer equal opportunities to contribute

their quota, represented adequately and received same benefit from various REDD+ policies, programmes and funds to be able to act and response to the forest from the perspective of environmental and social sustainability (GOG, 2015).

The missing link here is that, the policy is national in character and at the same time government policy is misguided in terms of regional drivers for fuel wood which may have potential impact on deforestation and environmental degradation and Ghana's REDD+ Road Map. The potential of REDD+ in Ghana appears to be blurred and unaccounted for due to information asymmetry with the programme implementation; at the same time, the country's readiness in terms of micro level consultation and community level involvement is slow (Quartey, 2014).

The pilot proposals of REDD+ targets undertaken in Ghana were in the High Forest Zone (HFZ) but not in the transitional zone or savannah regions (FAO, 2011). Unfortunately, bush burning and high demand for fuel wood are manifested in the transitional zone and savannah regions. The Northern Region which is part of the savannah regions is characterized by bush burning (for hunting) and fuel wood commercialization. What obviously is missing too in the REDD+ Road Map is gender coping strategies to mitigate the possible negative effects of the implementation of the REDD+ programme. For example, if REDD+ targets a decrease of 60% of fuel wood from standing forest stocks by 2020, this could increase the cost of fuel wood by 60% in Ghana, (Ghana Energy Commission, 2006). This is likely to further worsen the situation of over dependence on fuel wood in the Northern Region.

Meléndez et al. (2012) explained that, development comes with its attendant stressful events and individuals must cope using several strategies. The ability of people to cope with changing events, such as policy implementations, institutional changes tells how people within a social framework adapt to adverse situations. Furthermore, coping has three domains: appraisal (cognitive coping), problem (behavioural coping) and emotion (emotional coping). These domains of coping on the part of gender are needed to be incorporated into the REDD+ Road Map. Obviously, incorporating gender issues on energy policy interventions is critical.

The question that needs attention is: do empirical studies analyze and review households' fuel wood dependence, REDD+, and gender coping strategies in the Northern Region?

The study sought to review literature on households' fuel wood dependence, REDD+ and gender coping strategies in the Northern Region. It specifically objects to: analyse and review empirical studies on households' fuel wood dependence, REDD+, and gender coping strategies in the Northern Region.

The study is motivated as the issue of REDD+, and gender is new and has taken center stage in sustainable development efforts of the United Nations. The study brings to bear micro level analysis of possible impacts of the introduction of the REDD+ programme in the Northern Region of Ghana and the way forward. The study provided a synergy between households fuel wood dependence, REDD+, and how gender would cope with the attendant consequences if they so come. In addition, it will be a ground

breaking effort in Ghana to reveal to policy makers and future researchers on the way forward on localized issues of environmental degradation.

## **Methodology**

This study was a systematic review to investigate households' fuel wood dependence, REDD+ and gender coping strategies. Human ecology generally refers to the study of the dynamic interrelationships between human population and the physical, cultural and social characteristics of the environment and biosphere (Lawrence, 2003; Ogato, 2013 cited in Ogato, 2013b).

The study is a review, by taken into consideration availability of current knowledge in published literature in English. It attempts to bring to bear pertinent issues that hinge on forest literature and gender issues. Out of the one hundred and eighty (180) sets of empirical studies in this domain, only twenty five (25) articles were considered to have a direct bearing on this topic. The study therefore, reviewed the available literature to identify the gaps regarding households' fuel wood dependence, REDD+ and gender coping strategies. The search descriptor was: households' fuel wood dependence, REDD+ and gender coping strategies in article databases. The study considered only published literature in the period 2007-2016. The reason was to provide currency in terms of literature to the study. There was no specific geographical limitation as such could provide divergent views to the study and all articles were categorized according to themes.

The study reviewed twenty five (25) out of One Hundred and Eighty (180) published articles in various databases downloaded and studied. A conclusion was drawn on the bases of gaps identified and recommendations made for future empirical research.

## **Level of Analysis**

The study used "level of analysis" to point to size, location or the magnitude of research target undertaken in the literature review. This is quite prevalent in social sciences discipline especially in review papers. The review was based on four key concepts as follows; micro-level, meso-level, meta-level, and macro-level analysis.

*Micro-level analysis* pertains to studies at the local or individual level in any social framework; for instance, household studies. *Meso-level analysis* has to do with studies that take a population size between micro and macro levels analysis; for instance, studies on tribe, village, community and so on. *Meta-level analysis* usually employed quantitative statistical analysis to undertake a pool data for statistical test. The *macro-level analysis* refers to studies relating to large population or global level; for instance, studies on nation as a whole, international or global and so on.

This study categorized the articles on the basis of author, year of publication, name of the journal, the theme of the study, country related study, methodology employed, theoretical postulation, level of analysis used, and the database in which the manuscript appeared. The goal was to identify gaps from the perspective of theory, methodological, issue, contextual and the level of analysis. The major gaps identified from the review process were then presented as the results of the study and

recommendations were provided as to the future direction of research and that of policymakers.

### **Results and Discussions**

This study reviewed twenty five (25) published research articles and the results showed some gaps identified from theory, issue, contextual, methodological and level of analysis used (Table 1). The implication regarding the trends in empirical research and the availability of substantial body of knowledge and information to address issues regarding households' fuel wood dependence, REDD+ and gender coping strategies is considered to be linked to economic development.

**Table 1: Databases Published Articles and Review**

S/N	Author/Year	Name of Journal	Theme	Country	Methodology	Theory	Level of Analysis	Database
1	Kohlin et al (2011)	Policy Research Working Paper (5800)	Energy Access, Welfare and Gender	Global	Quantitative		Macro-level analysis	World Bank
2	Knight and Rosa (2012)	Population Environment	Household Fuel wood Consumption dynamics	Developing Countries	Quantitative	STIRPAT MODEL	Meta-level analysis	Springer
3	Mwakaje et al (2013)	International Journal of Biodiversity and Conservation	REDD+ on forest livelihood by Gender	Tanzania	Quantitative	Statistical and Livelihood Models	Micro-level analysis	Academic Journals
4	Roe (2010)	CBD Technical Series	Biodiversity Conservation and Poverty Alleviation	Global	Mixed Method		Macro-level analysis	IIED
5	Munoz (2012)	Issue Paper (No.7)	Bioenergy and REDD+	Global	Qualitative		Macro-level analysis	UNEP
6	Pfaff et al (2013)	Environmental Economics Policy	Global	Global	Qualitative	Profit Maximization and	Macro-level analysis	Oxford Journals

						Rural Household Optimization		
7	Dresen et al (2014)	Land	Fuel wood Savings and Carbon Emission Reduction	Ethiopia	Quantitative		Meso-level analysis	MDPI Journals
8	Bowler et al (2012)	Front Environment Ecol	Community forest management and environmental benefits	Global	Qualitative	Community forest management	Meta-level analysis	Ecological Society of America
9	Environmental Department (2007)	Policy Research (40218)	Poverty and Environment and household level	Global	Quantitative		Macro-level analysis	World Bank
10	Engoke et al (2013)	Policy brief	REDD-Forestry and climate	Nepal	Mixed		Macro-level analysis	Google
11	Melendez et al (2012)	Spanish Journal of Psychology	Coping Strategies: gender differences and development	Spain	Quantitative		Micro-level analysis	Redalyc



<b>12</b>	Shackleton et al (2008)	Policy document	Ecosystem services and poverty reduction research	Sub-Saharan Africa	Quantitative		Macro-level analysis	CEPSA
<b>13</b>	Siebert and Belsky (2015)	Science Direct	Managed fuel wood harvesting for energy, income and conservation	Bhutan	Qualitative		Macro-level analysis	Elsevier
<b>14</b>	Krausmann et al (2008)	Ecological Economics	Global patterns of socioeconomic biomass flows supply	Regional/Global	Quantitative		Macro-level analysis	Google Scholar
<b>15</b>	SCBD and GIZ (2011)	Policy document	Biodiversity and Livelihood REDD-plus Benefits	Global	Qualitative		Macro-level analysis	Google
<b>16</b>	Norman and Nakhooda (2014)	Working Paper #5 (378)	The state of REDD+ Finance	Global	Mixed		Macro-level analysis	Google Scholar
<b>17</b>	Mann et al (2010)	Review	Ghana's Rural finance and Climate Regime	Ghana	Qualitative		Meso-analysis	Google

<b>18</b>	Haq et al (2010)	Journal of Sustainable Development	Perception, Environmental Degradation and Family size preference	Developing countries	Conceptual		Macro-level analysis	CCSENET
<b>19</b>	De (2012)	Environment and Natural Resources Research	Livelihood, Dependence on Forest and its Degradation	Meghalaya	Quantitative		Micro-level analysis	CCSENET
<b>20</b>	Manyo-Plange (2011)	Not available	Changing Climate of Household Energy	Ghana	Mixed		Micro-level analysis	SSRN
<b>21</b>	Malonza and Fedha (2015)	International Journal of Scientific and Technology Research	Assessment of Gender and Energy	Kenya	Qualitative	Gender in Development Approach	Macro-level analysis	IJSTR
<b>22</b>	Kalaba et al (2013)	Ecosystem Services	Role of forest provisioning ecosystem services in coping with household stress and shocks	Zambia	Mixed		Micro-level analysis	Elsevier

<b>23</b>	Uprety et al (2011)	Policy document	REDD+ and Conflict	Nepal	Qualitative		Meso-level analysis	Google
<b>24</b>	Beyene et al (2013)	Environmental and Development Economics	Community controlled forests, Carbon sequestration and REDD+	Ethiopia	Quantitative		Macro-level analysis	PDXScholar
<b>25</b>	Mapira and Munthali (2011)	Journal of Sustainable Development in Africa	Household Energy Demand- Wood fuel and Peru- urban Deforestation	Zimbabwe	Quantitative		Micro-level analysis	Google Scholar

Table 1 considered databases published articles and review to identify existing themes for the study. The review identified four (4) themes related to the topic and research articles reviewed. The theme includes the following;

**Themes:**

**Theme 1:** Households Fuel wood Dependence

**Theme 2:** REDD+ Implementation and Gender

**Theme 3:** Gender Issues

**Theme 4:** Coping Strategies

The review decoupled each article and allocated to the research theme it belongs and the result is shown in the above Table 2.

**Table 2: Allocation of Each Research Article to Research Themes**

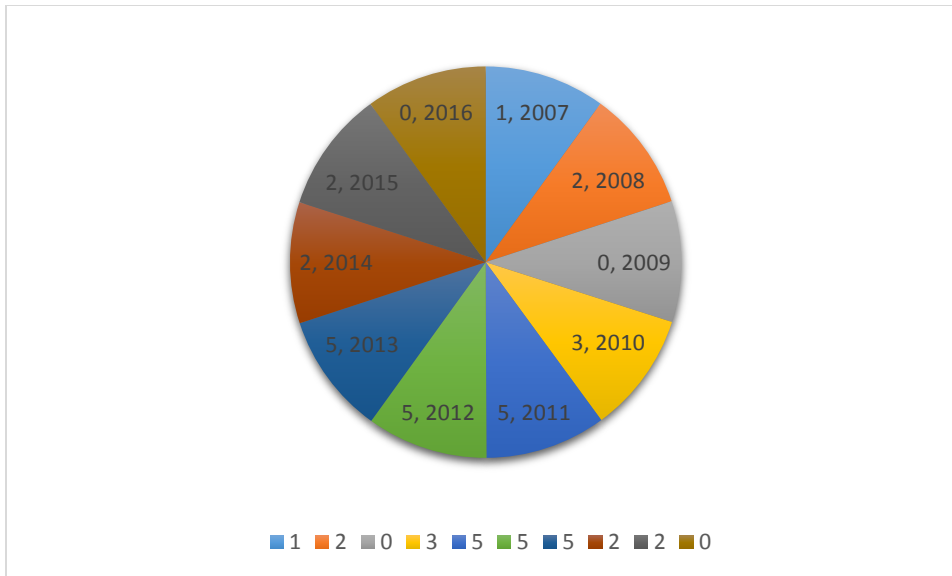
Research Themes	Article Number
Households fuel wood dependence	2,7,8,9,12,13,14,19,20,25
REDD+	4,5,6,10,15,16,17,18,23,24
Gender	1,3, 21
Coping Strategies	11, 22

**Source:** Authors' construct, 2016

The results in Table 2 show that over the years research is focused on both household fuel wood dependence 10 (40%) and REDD+ 10 (40%). Also, very few research were conducted in the area of gender and coping strategies within the forestry mainstreaming sector. The results further show an existing gap in terms of households fuel wood dependence, REDD+ and gender coping strategies as a combined study and hence, the importance of the current study.

**Households Fuel wood Dependence, REDD+ and Gender Coping Strategies Research Articles by Year of Publication**

The review grouped the research articles according to year of publication. This was to identify the space of knowledge contribution to the various themes and gaps available. Figure 1 below provides the results of the study.



**Figure 1: Households Fuel wood Dependence, REDD+ and Gender Coping Strategies Research Articles by Year of Publication**

**Source:** Authors’ construct, 2016

Figure 1 shows that, majority of the studies on the themes occurred in both years 2012 (5) and 2015 (5); with 3 articles in 2010 followed by 2 articles each in 2008, 2014 and 2015. In 2009 and 2016, no article was identified to belong to any of the themes. An observation is that, current studies referring to 2016 on these themes are limited and were not identified. However, the implementation and advocacy for REDD+ have received tremendous efforts from many policymakers in recent times. Therefore, this current study offers an impetus to stimulate issues of fuel wood, REDD+ and gender coping strategies particularly in developing countries.

The study mapped the identified research themes with methodology used in all the articles reviewed. The idea was to make known the frequently used methodology under each theme. The results were a mixed one coupled with availability of gaps as shown in Table 3.

**Table 1: Mapping of Households Fuel wood Dependence, REDD+ and Gender Coping Strategies Research Articles by Themes and Methodology**

Themes	Methodology			
	Qualitative	Quantitative	Mixed Method	Conceptual
Households fuel wood Dependence	8,13	2,7,9,12,14,19,25	20	
REDD+	5,6,15,17,23	24	4,10,16	18

Gender	21	1,3		
Coping Strategies		11	22	

**Source:** Authors' construct, 2016

Table 3 provides evidence that research on households' fuel wood dependence was purely quantitative by methodology with few qualitative ones. Mixed method was used and no conceptual research was undertaken. This suggests that many researchers do not focus on conceptual methodology. This approach is lacking in the body of environmental and natural resources economics and development economics. Our paper also identified conceptual gaps as many of these studies do not consider conceptual underpins. We found that conceptual studies were missing related to issues of gender and gender coping strategies. In terms of methodological gap, it was observed that many of the studies reviewed centered on both quantitative and qualitative methodologies. REDD+ was what received substantial attention from all the aforementioned methodology but it was particularly tilted towards qualitative and mixed methods.

We also mapped the research themes by the level of analysis used in each study. The results are indicated in Table 4.

**Table 2: Mapping of Households Fuel wood Dependence, REDD+ and Gender Coping Strategies Research Themes by Level of Analysis**

Themes	Level of Analysis			
	Micro	Meso	Meta	Macro
Households fuel wood Dependence	19,20,25	7	2,8	9,12,13,14
REDD+		17,23		4,5,6,10,15,16,18,24
Gender	3			1,21
Coping Strategies	11,22			

**Source:** Authors' construct, 2016

Table 4 is concerned with mapping of households' fuel wood dependence, REDD+ and gender coping strategies research themes by level of analysis. On the issue of fuel wood dependence, majority of the studies are on macro-level and micro-level analyses. With fewer meso and meta-level analyses. In relation to REDD+ theme, studies were concentrated on the macro-level analysis with fewer meso analysis. There was a gap on micro and meta-level analyses. This was considered a worrying gap since degradation according to empirical literature is caused at the micro level and at the same time, its effects felt at the micro level. In addition, the gender theme focused on macro-level analysis and few micro- level analysis.

There was no study on meso and meta-level analyses respectively. We identified the coping strategies theme to belong to micro-level analysis with huge gap for meso, meta and macro-level analysis respectively. The study has revealed that these gaps affected sustainable development efforts in the forestry sector. A large fraction of the papers reviewed investigated their themes using macro-level analysis. The problem with macro-level analysis is that if the policy recommendations are implemented, they are unlikely to trickle down to the local or community level since the studies are most often at the global or national level.

### **Conclusion**

This paper has reviewed and used twenty five papers on households' fuel wood dependence, REDD+ and gender coping strategies. The study was a systematic review, considering the possible negative impact REDD+ programme in Ghana on households' fuel wood consumption patterns and gender coping strategies in the Northern Region of Ghana.

We found that there was no enough sensitization at the Northern Region because the policy consultation was too simplistic and assumed national character. The local communities could resist this new policy, since it would affect their livelihood negatively. In addition, no clear cut policy on REDD+ Finance to mitigate any possible consequences of the policy implementation.

The study recommended that, government must provide enough education at the local level and at the same time offer livelihood alternative for the people. There should be a clear cut policy on REDD+ Finance for households in the Northern Region, particularly, gender to hasten their ability to adapt and cope should the consequences of the implementation of the REDD+ programme.

### **Policy Implication in the Northern Region**

The Northern Region of Ghana is the largest region in Ghana in terms of land size. The inhabitants cherished traditional values and therefore, attached tradition to many facets of their lives. The region is savannah in nature, yet the people depend heavily on fuel wood as their preferred form of energy. The United Nations has promulgated and urged countries to adopt REDD+ Programme aimed at reducing global warming and environmental degradation.

The Northern Region of Ghana is part of the regional considerations in terms of the implementation of the Ghana's REDD+ programme, the region has households dependent on fuel wood as a preferred energy, and women are the main gatherers of fuel wood. The implications are serious considering that the following gaps are identified in the study. In the first place, the study observed that, current researches are limited in addressing gender coping strategies in the implementation of the REDD+ programme in Ghana and this could have potential effects on women livelihood and energy consumption particularly fuel wood in the Northern Region of Ghana.

Also, there seem to be neglect of gender issues in empirical literature in forestry management policies, even though policy documents by women groups have worked and advocated the importance of women in forestry. Perhaps, it may be attributed to the newness of issues of gender mainstreaming in the forest literature.

Perhaps, this current study on households' fuel wood dependence, REDD+ and gender coping strategies in the Northern Region of Ghana is based on information asymmetry which is fueled by the national nature in which the REDD+ programme is handled in Ghana. This is because the pilot proposals of REDD+ targets were in the High Forest Zone (HFZ) but not in the transitional zone or savannah regions (FAO, 2011 cited in Quartey, 2014). This is evidently supported by Mwakaje et al (2012) studies on REDD on forest dependent households by gender in Tanzania when they identified information challenges as a gap to the smooth implementation and acceptability of REDD to households.

The policy implications of this study pointed to local communities' resistance because of limited education on this REDD+ programme.

### **Limitation of the Study**

This study is entirely a systematic review and it considered one hundred and eighty (180) published peer reviewed research articles of which only twenty five directly related to this present study was used. The study could have considered more published peer reviewed research articles from other databases to improve reliability and generalization of the study.

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