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Abuse Faced by Senior Citizens Residing in Old Age Homes

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Abstract: Globally the demographic landscape is undergoing significant shifts, with aging populations emerging as one of the key megatrends alongside population growth, international migration, and urbanization. According to the World Health Organization the population of older individuals is expected to double by 2050with the, challenges becoming increasingly pronounced. In India alone, millions of elderly individuals face issues of purposelessness, financial insecurity, and physical dependency, compounded by changing familial structures and societal dynamics.

In this context, primary data-based studies conducted in various cultural pockets of Haryana, India, were carried out to shed light on the prevalence and nature of elder abuse. The results revealed high incidences of neglect, physical harassment, financial exploitation, emotional harassment, and even sexual harassment faced by elderly individuals. However, transitioning to old-age homes appears to mitigate instances of abuse, suggesting the vital role these facilities in safeguarding elderly individuals and ensuring their well-being. Notably, neglect reduced significantly post-transition, along with decrease in physical abuse, financial exploitation, emotional harassment, and sexual harassment. These findings underscore the importance of old-age homes as protective environments for vulnerable elderly populations.

Nevertheless, old-age homes encounter multifaceted challenges in meeting the diverse needs of senior citizens, including social isolation, health issues, financial constraints, and housing-related problems. Effective strategies and additionally, initiatives such as strengthening legal frameworks, community engagement and intergenerational activities can contribute to enhancing the overall quality of life for elderly individuals residing in old-age homes.

Keywords: Elderly individuals, Physical abuse, Financial exploitation, Emotional harassment, Sexual harassment.

1. INTRODUCTION

Among four of the global demographic megatrends, population aging has been one along with population growth, international migration and urbanization which continue and impact the sustainable development (Report of the Secretary-General, 2019). According to World Health Organization (WHO) it is estimated that during 2015 to 2050 the proportion of old age people will nearly double from 12% to 22% (WHO 2018). Global population of individuals falling in the age group of 65 years in the year 2019 was reported to be around 703 million (World Population Ageing 2019). In India alone 6.39% of the total population falls within the age group of 65 years or above with 39,184.523 males and 43,654,994 females (India Demographics Profile 2019).

In the pre industrialized era, life spans were shorter and older people were taken care of by extended families. Families were responsible for caring humanely and compassionately. Older people were honored and revered. Globally, industrialization and urbanization has drastically changed social and familial life. The extended family has disappeared and young people have been forced to leave rural areas to work to survive. Many older people have no one to care for them and neglected and forgotten (Sharma *et al.*, 2024).

The main problem of elderly people is feeling purposelessness, financial insecurity, physical dependency, problems in hospitals along with others such as general personal problems of elderly;

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https://www.theaspd.com/ijes.php

family problems; problems faced by elderly in hospitals and at public places. Majority of the old people feel that their life is problematic because they were physically and financially dependent (Kaur *et al.*,2019). Mostly older people want to stay at home, in local communities as they age. A study conducted among pre-elderly adults in Peninsular Malaysia found that 83 percent of the respondents want to live their rest of life in their homes (Samsudin *et al.*, 2019). However, older people, particularly older women are compelled to shift to old age homes (Jeeragyal *et al.*, 2019), as there are no longer families able to care for them. They may have no support from children, misbehaviour and abuse from daughter in law, death of spouse, strained relation. This results in shifting to the Old Age Homes (Gupta *et al.*, 2014; Storey, 2020).

This primary data-based study will endow us to understand the difficulties faced by old aged people residing in old age homes. This study will help us to explore the experience of the old age people, to emphasize the nature and extent of barriers and difficulties faced by them.

By keeping all the important points in view this study has been designed with the following objectives: To study the nature and extent of difficulties faced by people residing in old age homes to delineate the factors associated with the abuse problems of old aged people to suggest strategies to mitigate the problems of aged people.

2. METHODOLOGY

The study was conducted in five different cultural pockets in the state of Haryana: Bagar, Khadar, Mewat, Nardak, and Ahirwal. Two randomly selected districts were selected from each cultural pocket. Twenty respondents were selected especially for the study in each location. Two hundred respondents in all, ten of them elderly men and ten of them elderly women, who were sixty years of age or older and who lived in old age homes located in both rural and urban areas of specified districts, were selected. Data was collected through the use of carefully thought out and regulated interview schedules. MS Excel was used for coding and making graphs whereas SPSS was used for further calculations.

3. RESULTS

3.1. Negation of the Respondents

Regarding the data of neglect behaviour faced by the respondents is shown in table 1 or figure 1 where 80.00 percent of the respondents accepted that they had faced neglect abuse, and on the contrary, one-fifth of the respondents i.e., 20.00 percent accepted that they had not faced any kind of neglect abuse in their life.

Table 1. Negation of the respondents

i.	Neglect	Frequency	Percentage
a.	Yes	160	80.00
b.	No	40	20.00

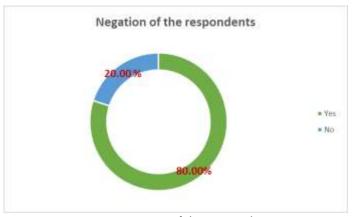


Fig. 1 Negation of the respondents

ISSN: 2229-7359 Vol. 11 No. 9s, 2025

https://www.theaspd.com/ijes.php

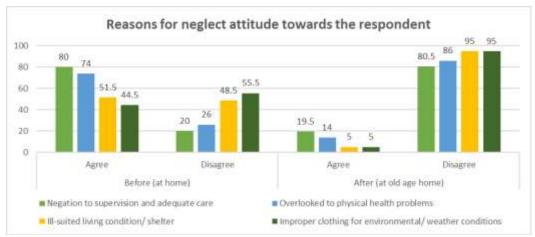


Fig. 2 Reasons for neglect attitude towards the respondent

3.2. Reasons for Neglect Attitude Towards the Respondents

In table 2 or figure 2, the reasons for neglect attitudes toward the respondents have been discussed where it can be clearly seen that 80.00 percent of the respondents agreed that they had faced negation to supervision and adequate care back at home before coming to the old-age home and 20.00 percent of the respondents disagree for the same. On the other hand, after coming to the old-age home, the percentage of the respondents who are facing the negation to supervision and adequate care decreased to 19.50 percent, and where 80.50 percent of the respondents disagree for this same. Respondents who had faced overlooked behavior to physical health problems was 74.00 percent while 26.00 percent disagree for the same before coming to the old-age home. After coming to the old-age home, 14.00 percent of the respondents agreed that their physical health had been overlooked or neglected while 86.00 percent of the respondents disagree for the same. Before coming to the old-age home 51.50 percent of the respondents agreed that they had been provided with ill-suited living condition/shelter back at home, whereas 48.50 percent of the respondent disagree for the same. On the contrary after coming to the old-age home, only 5.00 percent of the respondents agreed that they are facing insulted living conditions/shelter and 95.00 percent of the respondents disagree for the same. Problem regarding improper clothing for environmental/weather condition had been faced by 44.50 percent of the respondents and 55.50 percent disagree for the same before coming to the old-age home. And after coming to the old-age home 5.00 percent of the respondents agreed that they are not provided with proper clothing for environmental/weather conditions while 95.00 percent of the respondents disagree for the same.

Table 2. Reasons for neglect attitude towards the respondents

	Tuble 2. Reasons for neglect attitude towards the respondents					
Sr.	Daggara	Before (at home)		After (at old age home)		
No.	Reasons	Agree	Disagree	Agree	Disagree	
а.	Negation to supervision and adequate care	160 (80.00)	40 (20.00)	39 (19.50)	161 (80.50)	
ь.	Overlooked to physical health problems	148 (74.00)	52 (26.00)	28 (14.00)	172 (86.00)	
c.	Ill-suited living condition/ shelter	103 (51.50)	97 (48.50)	10 (5.00)	190 (95.00)	
d.	Improper clothing for environmental/ weather conditions	89(44.50)	111 (55.50)	10 (5.00)	190 (95.00)	

Figures in parentheses indicate percentage.

Responses were multiple.

ISSN: 2229-7359 Vol. 11 No. 9s, 2025

https://www.theaspd.com/ijes.php

3.3. Physical Harassment Faced by the Respondents

Table 3 depicts the data regarding physical harassment faced by the respondent where 31.50 percent of the respondents said that they had faced physical harassment and 68.50 percent said that they had never faced any kind of physical harassment in their life.

Table 3. Physical Harassment faced by the respondents

ii.	Physical Harassment	Frequency	Percentage
a.	Yes	63	31.50
b.	No	137	68.50

3.4. Reasons of Physical Harassment by the Respondents

Table 4 clearly shows the responses of the respondents towards different reasons of physical harassment faced by them before coming to the old-age home that is back at home and after coming to the old-age home. Respondents who agreed that they had been hit before at home was 28.50 percent. But after coming to the old-age home, the percentage has been decreased to 1.00 percent and 99.00 percent of the respondents said that they had not been hit as physical harassment. One-fourth of the respondents that is 25.00 percent accepted that they had been pushed before at home and on the contrary after coming to the old-age home, 6.00 percent of the respondents agreed for the same. Regarding kicking as physical harassment, 25.50 percent of the respondents accepted that they had been kicked before at home whereas now after coming to the old-age home, no such responses had been noted. Respondents who had been threatened with knife back at home was 14.00 percent and now after coming to the old-age home 100.00 percent of the respondents disagree for the same.

Table 4. Reasons of physical harassment by the respondents

Sr. No.	Reasons	Before (at home)		After (at old age home)	
		Agree	Disagree	Agree	Disagree
a.	Hitting	57(28.50)	143 (71.50)	2 (1.00)	198 (99.00)
b.	Pushing	50 (25.00)	150 (75.00)	12 (6.00)	188 (94.00)
c.	Kicking	51 (25.50)	149 (74.50)	00 (0.00)	200 (100.00)
d.	Threatened with knife	28 (14.00)	172 (86.00)	00 (0.00)	200 (100.00)

Figures in parentheses indicate percentage.

Responses were multiple.

3.5. Financial Exploitation Faced by the Respondents

The data in table 5 clearly unveil that 44.00 percent of the respondents had faced financial exploitation, whereas 56.00 percent of the respondents had not faced any kind of financial exploitation.

Table 5: Financial exploitation faced by the respondents

iii.	Financial exploitation	Frequency	Percentage
a.	Yes	88	44.00
b.	No	112	56.00

3.6. Reasons of Financial Exploitation by the Respondents

The data in table 6 orchestrated about the reasons of financial exploitation faced by the respondents, where 40.00 percent of the respondents agreed that there has been demand for money from them before coming to the old-age home that is back at home and the same percentage i.e., 40.00 percent of the respondents agreed that they had been treated like a burden to the family on financial basis back at home before coming to the old-age home followed by 36.00 percent of the respondents who agreed that their other assets had been taken from them without their consent, 31.50 percent of the respondents said that they are not aware of their financial rights and 28.00 percent of the respondents agreed that there has been demand to transfer their property. On the other hand, after coming to the old-age home then no such abuse had been noted except 6.00 percent of the respondents accepted that they are not

ISSN: 2229-7359 Vol. 11 No. 9s, 2025

https://www.theaspd.com/ijes.php

aware of their financial right.

Table 6. Reasons of Financial exploitation by the respondents

Sr.	Daggara	Before (at home)		After (at old age home)	
No.	Reasons	Agree	Disagree	Agree	Disagree
a.	Demand for money	80 (40.00)	120 (60.00)	00 (0.00)	200 (100.00)
b.	Demand to transfer property	56 (28.00)	144 (72.00)	00 (0.00)	200 (100.00)
c.	Other assets taken without consent	72 (36.00)	128 (64.00)	00 (0.00)	200 (100.00)
d.	Are you not aware of your financial rights?	63 (31.50)	137 (68.50)	12 (6.00)	188 (94.00)
e.	Treated like a burden to the family	80 (40.00)	120 (60.00)	00 (0.00)	200 (100.00)

Figures in parentheses indicate percentage.

Responses were multiple.

3.7. Emotional Harassment Faced by Respondents

It is clearly revealed in table 7, that 55.50 percent of the respondents accepted that they had faced emotional harassment and 44.50 percent of the respondent said that they had not faced any kind of emotional harassment.

Table 7. Emotional Harassment faced by respondents

iv.	Emotional Harassment	Frequency	Percentage
a.	Yes	111	55.50
b.	No	89	44.50

3.8. Reasons of Emotional Harassment by the Respondents

It can be clearly seen in table 8, that 54.00 percent of the respondents agreed that they had faced confinement/isolation before coming to the old-age home that is back at home followed by 42.00 percent of the respondents said that they had faced humiliation and the same percentage was found among who had faced insults back at home before coming to the old-age home. Respondents who faced verbal abuse constitute 40.00 percent of all whereas 32.00 percent of the respondent accepted that they had been threatened to be homeless or to put them in old-age home. But after coming to the old-age home 12.50 percent of the respondent had faced insults and the same percent of the respondent had faced humiliation followed by 6.00 percent of the respondents had faced confinement/isolation, 5.00 percent of the respondents faced verbal abuse and 2.00 percent of the respondents had been threatened to be homeless.

Table 8. Reasons of emotional harassment by the respondents

Sr.	Reasons	Before (at home)		After (at old age home)	
No.	Reasons	Agree	Disagree	Agree	Disagree
a.	Verbal abuse	80 (40.00)	120 (60.00)	10 (5.00)	190 (95.00)
b.	Threatening you to be homeless or to put you in old age home	64 (32.00)	136 (68.00)	4 (2.00)	196 (98.00)
c.	Insults	84 (42.00)	116 (58.00)	25 (12.50)	175 (87.50)
d.	Humiliation	84 (42.00)	116 (58.00)	25 (12.50)	175 (87.50)
e.	Confinement/ Isolation	108 (54.00)	92 (46.00)	12 (6.00)	188 (94.00)

Figures in parentheses indicate percentage.

Responses were multiple.

ISSN: 2229-7359 Vol. 11 No. 9s, 2025

https://www.theaspd.com/ijes.php

3.9. Sexual Harassment Faced by Respondents

It is clearly shown in the table 9 that 10.00 percent of the respondent had faced any sort of sexual harassment in their life while 90.00 percent of the respondents said that they had not faced any kind of sexual harassment.

Table 9: Sexual Harassment faced by respondents

v.	Sexual Harassment	Frequency	Percentage
a.	Yes	20	10.00
b.	No	180	90.00

3.10. Reasons of Sexual Harassment by the Respondents

In table 10, it is clearly revealed that 10.00 percent of the respondents faced sexual assault followed by 6.00 percent of the respondents agreed that it had been by the neighbours /outsiders, 5.00 percent of the respondents accepted that it had been by the relatives and 4.00 percent of the respondents accepted that it had been by close family members. While after coming to the old-age home, no such malpractices had been observed or faced by the respondents.

Table 10: Reasons of Sexual Harassment by the respondents

Sr.	Daggara	Before (at home)		After (at old age home)	
No.	Reasons	Agree	Disagree	Agree	Disagree
a.	Sexual Assault	20 (10.00)	180 (90.00)	00 (0.00)	200 (100.00)
b.	By close family members	8 (4.00)	192 (96.00)	00 (0.00)	200 (100.00)
c.	By relatives	10 (5.00)	190 (95.00)	00 (0.00)	200 (100.00)
d.	By neighbors/ outsiders	12 (6.00)	188 (94.00)	00 (0.00)	200 (100.00)

Figures in parentheses indicate percentage.

Responses were multiple.

4. DISCUSSION

Elder abuse is a disturbing social problem that can take many different forms, including financial, emotional, physical, and even neglectful mistreatment. While emotional abuse comprises verbal anger, humiliation or isolation, physical abuse involves violent acts like punching or restraining. Vulnerability is increased by financial exploitation, which involves elderly being forced or tricked into giving up their possessions. Whether deliberate or inadvertent, neglect leads in the denial of treatment that is required, which deteriorates both physical and mental health. Elder abuse frequently takes place in familial or carer relationships, with offenders taking advantage of the weakened competence and need of the elderly.

The data highlights the pervasive issue of elder abuse in various forms, including financial exploitation, emotional, physical, and neglectful mistreatment (DeLiema et al, 2012; Amiri, 2018; Rahman, 2020). Before residing in old-age homes, 80.00 percent of respondents experienced neglect, mainly due to inadequate care and supervision at home and similar results was found in the study conducted by Thomas, 2018. However, post-transition, neglect reduced to 19.50 percent. Physical harassment, such as hitting, pushing, and kicking, affected 31.50 percent of respondents before moving to old-age homes, while after the transition, instances of physical abuse significantly decreased. Financial exploitation impacted 44.00 percent of respondents, primarily through demands for money and assets, before transitioning, but this decreased post-transition, with only 6.00 percent being unaware of their financial rights. Non-physical acts of anger, humiliation, or isolation that cause severe anguish and compromise mental health are examples of emotional abuse directed at the elderly. The self-worth and emotional fortitude of elderly people are undermined by this subtle kind of maltreatment. Elder abuse victims are frequently taken advantage of, which exacerbates emotions of abandonment and loneliness. Emotional harassment, including verbal abuse and threats, affected 55.50 percent of respondents, with instances of insults, humiliation, and confinement reducing post-transition. Similar results were also found in other

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https://www.theaspd.com/ijes.php

studies conducted by Oh *et al*, 2006; Wu *et al*, 2012; Dong, 2015. Any sort of non-consensual behaviour, including coercion or unwanted sexual contact, towards older adults is considered sexual abuse and causes great misery. Seniors' fragility typically exacerbates the long-lasting mental and physical wounds left by this abhorrent act. The perpetrators take advantage of trust, reliance, and power disparities. Sexual harassment and assault affected 10.00 percent of respondents before moving to oldage homes, corresponds to the study done by Dong, 2014 but no such instances were reported post-transition. The data underscores the significance of old-age homes in providing a safe environment for elderly individuals, mitigating instances of abuse, and ensuring their well-being. Smith's study highlights strained family relations by identifying "misbehaviour of children" as the primary cause (29.8 percent) that leads elderly adults to live in old-age homes.

5. CONCLUSION AND SUGGESTIONS

The data highlights the prevalence of elder abuse, encompassing financial exploitation, emotional, physical, and neglectful mistreatment. The disturbing problem of neglect abuse directed against the elderly is characterised by the omission of critical care and attention. This type of maltreatment may take the form of insufficient food, housing, medical attention, or emotional support. It frequently has detrimental effects on elderly people's physical and mental health. Carer carelessness, a lack of resources, or deliberate indifference to senior needs can all result in neglect. Prior to the transition, a substantial number of respondents experienced neglect, but this issue saw a notable reduction afterward. Similarly, physical abuse and financial exploitation also decreased significantly posttransition. Emotional harassment, while prevalent before the transition, showed improvement as well. Sexual harassment, though reported initially, was entirely absent after the transition. Overall, the transition brought about a considerable improvement in the well-being of respondents across various forms of abuse and exploitation. These findings emphasize the role of old-age homes in safeguarding elderly individuals from abuse and ensuring their well-being. Old-age homes face multifaceted challenges in meeting the needs of senior citizens, including social isolation, health issues, financial constraints, and housing-related problems. Effective strategies encompass healthcare provision, financial support, rehabilitation programs, and housing improvements to enhance seniors' well-being. Addressing social isolation through community engagement, providing quality healthcare, facilitating financial assistance, and ensuring comfortable living conditions are essential. Additionally, initiatives like educational campaigns and intergenerational engagement can further support seniors' needs.

To address elder abuse effectively, it is essential to strengthen the legal framework by enacting and enforcing laws that specifically prevent and punish all forms of elder abuse, including financial exploitation, physical abuse, emotional harassment, and neglect. Mandatory reporting laws should be implemented, along with regular inspections and audits of old age homes to ensure compliance with care standards and identify any instances of abuse. Increasing penalties for elder abuse offenders and creating special prosecutorial units are crucial measures. Additionally, severe forms of emotional abuse should be criminalized, with legal recourse provided for victims. By implementing these comprehensive strategies, old-age homes can create a supportive environment and improve the overall quality of life for senior citizens.

REFERENCES

- Amiri, M., (2018). Problems faced by old age people. The International Journal Of Indian Psychology, 6(3):52-63.
- DeLiema, M., Gassoumis, Z. D., Homeier, D. C., & Wilber, K. H. (2012). Determining prevalence and correlates of elder abuse using promotores: Low-income immigrant Latinos report high rates of abuse and neglect. *Journal of the American Geriatrics Society*, 60(7): 1333-1339.
- Dong, X. (2014). Do the definitions of elder mistreatment subtypes matter? Findings from the PINE Study. *Journals of Gerontology Series A: Biomedical Sciences and Medical Sciences*, 69(Suppl_2): S68-S75.

ISSN: 2229-7359 Vol. 11 No. 9s, 2025

https://www.theaspd.com/ijes.php

- Dong, X. (2015). Elder abuse in Chinese populations: A global review. *Journal of Elder Abuse & Neglect*, 27(3): 196-232.
- Gupta, A., Mohan, U., Singh, S. K., Manar, M. K., Tiwari, S. C., & Singh, V. K. (2014). Home away from Home: Quality of Life, Assessment of Facilities and Reason for Settlement in Old Age Homes of Lucknow, India. *Indian Journal of Community Health*, 26(2): 165-169.
- Gupta, A., Mohan, U., Tiwari, S. C., and Singh, V. K. (2014). Quality of life of elderly people and assessment of facilities available in old age homes of Lucknow, India. *National journal of community medicine*, 5(01): 21-24.
- India Demographics Profile 2019: https://www.indexmundi.com/india/demographics_profile.html
- Jeeragyal, D. P., Sasidhar, M., Trivedi, R. A., John, K. R., and Somasekhar, M. M. (2019). Epidemiological Study on Relationship of Socio-Demographic Factors and Determinants to Shift to the Old Age Home Among Elderly Women in Chittoor, District AP. Religion, 80(14): 20.
- Kaur, S., Bhalla, A., Kumari, S., and Singh, A. (2019). Assessment of functional status and daily life problems faced by elderly in a North Indian city. *Psychogeriatrics*, 19(5): 419-425.
- Oh, J., Kim, H. S., Martins, D., & Kim, H. (2006). A study of elder abuse in Korea. *International journal of nursing studies*, 43(2): 203-214.
- Rahman, A. (2020). Poor, old, and in need of help.
- Report of the Secretary-General, (2019). The review and appraisal of the Programme of Action of the International Conference on Population and Development and its contribution to the follow-up and review of the 2030 Agenda for Sustainable Development (E/CN.9/2019/2).
- Samsudin, S., Abdullah, N., Ismail, N. S. A., Hassan, K., and Ahmad, U. A. (2019). Growing old at own home: A study among pre-elderly adults in Peninsular Malaysia. *Economics & Sociology*, 12(1): 115-124.
- Sharma, T., Tyagi, R., Sharma, T., and Kathpalia, J. (2024). Social problems of elderly residing in old age homes of Haryana. *International Journal of Agriculture Extension and Social Development*, 7(1): 32-37.
- Smith. Quality of Life: A Review-Google Scholar. Available from: https://scholar.google.com/scholar_lookup?journal=Educ+Aging and title=Quality+of+life: +A+review and author=AE+Smith and volume=15 and publication_year=2000 and pages=419-35 and.
- Storey, J. E. (2020). Risk factors for elder abuse and neglect: A review of the literature. Aggression and violent behavior, 50, 101339.
- Thomas, J. (2018). The Aging issues of senior citizens the welfare measures taken by changanacherry archdiocese through old age homes.
- WHO 2018: World Health Organization (WHO) 2018 fact sheet https://www.google.com/search? source=hp&ei=F4gdXujKHKW38QOwv7noDw&q=population+percentage+of+old+people+in+world&oq=population+percentage+of+old+people+in+world&gs_l=psy-ab.3...10374.34545...35214...0.0..

1.998.13580.2-34j6j1j1j2.....0....1..gws-

wiz......0j0i131j0i8i30j0i8i7i30.0MAGaoS5TYc&ved=0ahUK EwiosuDu4YLnAhWlW3wKHbBfDv0Q4dUDCAk&uact=5#

ISSN: 2229-7359 Vol. 11 No. 9s, 2025

https://www.theaspd.com/ijes.php

- World Population Ageing 2019: United Nations, Department of Economic and Social Affairs, Population Division (2019). World Population Ageing 2019: Highlights (ST/ESA/SER.A/430). Retrived from: https://www.un.org/en/development/desa/population/publications/pdf/ageing/WorldPopulationAgeing2019-Highlights.pdf
- Wu, L., Chen, H., Hu, Y., Xiang, H., Yu, X., Zhang, T., ... & Wang, Y. (2012). Prevalence and associated factors of elder mistreatment in a rural community in People's Republic of China: a cross-sectional study. *PloS one*, 7(3): e33857.