

Caregivers' Knowledge and Perception of Accidental Childhood Poisoning in selected hospitals in South-south Nigeria

Abstract:

Background: Accidental poisoning is a monumental challenge internationally and a major cause of morbidity and mortality among children in Nigeria. There is a paucity of data on the knowledge and perception of primary caregivers with regards to accidental childhood poisoning in the study locale. This study sets out to ascertain these so as to aid the development of suitable educational programmes.

Objective: To assess the knowledge and perception of accidental childhood poisoning among caregivers of under-five children in Edo and Delta States of Nigeria.

Methods: The study subjects included caregivers with children less than five years of age attending the Well-baby Clinics of four major hospitals in Edo State and Delta States, South-south Nigeria, between February and April 2016. A structured questionnaire served as an instrument to extract information on their biodata and their knowledge and perception of accidental childhood poisoning.

Results: Of the 632 caregivers studied, 38.8%, 36.2% and 25.0% had low, moderate and high levels of knowledge of accidental childhood poisoning respectively. The primary caregivers had poor knowledge on first aid following ingestion of a poisonous agent as the majority (90.2%) of them responded that palm oil is a good antidote for most poisons. The higher the level of education of the caregiver, the more likely it is that she would possess the correct knowledge on childhood poisoning and its prevention. The level of perception of accidental childhood poisoning among the caregivers was positive in 447 (70.7%) and negative in 185 (29.3%). The caregivers

had the negative perception to some specific statements on the scale; for instance indicating that it is safe to take one's medicines in the presence of the young child.

Conclusion/Recommendation: Caregivers with a high level of knowledge were few. The need for public enlightenment programmes on poisoning prevention, on appropriate first aid, should poisoning occur as well as disabusing caregivers' minds of certain negative perceptions of accidental childhood poisoning are again emphasized. The establishment of Poison Control Centres (PCCs) to aid in the achievement of this goal would be a step in the right direction.

Key Words: Accidental childhood poisoning, knowledge, perception, caregivers, Nigeria.

Introduction

Accidental poisoning as a form of childhood accident is a monumental challenge internationally and a principal reason for ill-health and mortality among children in Nigeria.¹⁻
³Accidental childhood poisoning in this context refers to unintentional acute poisoning among children involving chemicals, household products and drugs. It does not include chronic poisoning issues related to lead, with indoor air pollution or with other effects of repeated or prolonged exposure to toxic agents. Also excluded are allergic reactions to food or poisoning stemming from infectious agents.

Household products like petroleum distillates (especially kerosene) are the leading causes of poisoning in Nigeria.^{4,5} Types of poisons and the frequencies of poisonings tend to differ from one location of the country to another. Kerosene is a major source of poisoning in developing countries because of inadequate control of access to the substance.⁶ Exposure to kerosene is more common in developing countries because it is used as fuel for cooking and for lanterns making it easily accessible to children.⁷ Other agents of poisoning include caustic soda, alcohol,

household cleaning agents (e.g. bleach and detergents) and organophosphates in the form of insecticides, herbicides, among others.⁵

Children under five years are mostly at risk of accidental poisoning due to their innate desire to explore their world and the inability to perceive the dangers of their actions.⁸ Young children are quite active, curious and are fearless explorers. They tend to touch, test and explore their surroundings, getting in contact with toxic chemicals unsafely used or stored. Children under the age of five years account for the majority of all poison exposures with children up to two years old being particularly vulnerable.^{9,10} At two years of age, a child is at a developmental stage that is characterized by inquisitiveness, restlessness and impulsivity.¹¹ As a result, the two-year-old child engages in the aggressive exploration of his or her total environment and in doing so, every object in sight is closely examined for form, texture and taste. Hence, as expected, such a child is at high risk of being easily poisoned or injured by products in the environment.

In spite of numerous solutions proffered on the prevention and control of accidental poisoning in children, such as the storage of household products where they are inaccessible to children,¹² the use of safety devices like child-resistant containers (CRCs) for hazardous household products or medicines,¹³ proper labelling of hazardous substances with instructions for storage and use; and lots more, Nigerian children nonetheless continue to suffer grave and daunting consequences of accidental poisoning. Issues such as illiteracy may affect the parent or caregiver's ability to read warning labels or directions for use resulting in inability to follow written instructions making him or her prone to using chemicals unsafely.¹⁴ Lack of information and education often results in individuals ignoring or neglecting simple measures that could help to prevent the toxic effects of chemicals. However, those caregivers who may have higher poison prevention knowledge will likely have better behaviours related to poison safety.¹⁵ Low

socioeconomic status of families also predispose children to accidental poisoning as their caregivers are unable to purchase safety equipment, are exposed to hazardous environment and lack access to safety information and health services.^{5,16,17}

Numerous studies from different health establishments in the nation have utilized hospital records to assess specific poisonings occurring in childhood and their frequencies.^{8,10} The findings of these studies are essential because they aid in the identification of poisonous substances which are more prevalent in the communities studied. The identification and proper documentation of epidemiological characteristics as well as other variables in poisonings occurring in childhood are of immense importance in ascertaining proper preventive measures. Laudable as this may seem, it is yet to be seen how these limited studies may constitute and provide us with an acceptable national data base. It is not easy to estimate the total number and epidemiology of childhood poisonings in Nigeria as well as in most other developing nations, due to the lack of centralized data collection. However, they are of great importance even if dwarfed by infectious diseases and malnutrition.¹⁸ Nevertheless, accidental childhood poisoning constituted 3.3% of cases seen over a 10-year period in a private hospital in Benin City, Edo State.⁸

In the United States of America, almost 1.1 million cases of accidental childhood poisoning are reported to the hospital Emergency Departments and Poison Control Centers (PCCs) annually.¹⁹ Since there are likely more cases of poisonings that may not be reported, this overwhelming number of cases have the tendency to be higher. It is worthy of note that, poisoning was the third reason responsible for death arising from injury in children in 1999. This necessitated its thorough assessment, especially pertaining to new methods of reducing the incidence of harm from childhood poisonings yearly.²⁰ Based on a WHO report, accidental poisonings contributed to 300,000 deaths in year 2000.²¹ With increasing conurbation and

attendant overcrowding, accidents are most likely to become predominant public health challenges except preventive mechanisms are effected early.^{22,23}

In recognition of the burden of accidental poisoning among children and the associated morbidity and mortality, it is important that caregivers' knowledge and perception regarding the prevention of accidental childhood poisoning be ascertained. This would determine the content as well as the quality of health education to be given to caregivers and impart positively on policy formulation on childhood poisoning.

Methods

The study was carried out at the University of Benin Teaching Hospital (UBTH) and Central Hospital both in Benin City, Edo State, as well as the Federal Medical Centre, Asaba and Central Hospital, Warri both in Delta State. Edo and Delta States are located in South-South Nigeria. The study was conducted between February and April 2016. Subjects consisted of caregivers of children under five years attending the Well-Baby Clinics of the above-mentioned hospitals. A well-baby clinic is one that specializes in medical supervision and services for healthy infants. It is a health-service clinic meant for preventive monitoring such as growth monitoring as well as health education and advice for parents/caregivers of babies.²⁴ The sampling frame (6,321) was gotten from the numerical count of all mother-and-child pair that visited the four well-baby clinics the previous month. Then 10% of the total number from each health facility was recruited using simple random sampling.

A structured questionnaire was administered to subjects with the aim of documenting information on subject's age and educational status, their knowledge and perception regarding accidental childhood poisoning. Twenty questions were used for assessing the knowledge of subjects. A correct response was given a score of one while an incorrect response a score of zero.

The total knowledge score of each caregiver was classified as low knowledge when the score was between zero and 10 (0-10), as moderate between 11 and 14 and as high knowledge from 15 and above. There were 10 questions used for assessing the perception of the caregivers towards accidental childhood poisoning using a 5 point Likert scale consisting of strongly agree, agree, undecided, disagree and strongly disagree. For each statement on the scale, any mean score greater than 3 is considered as positive while any mean score less than 3 is regarded as negative. The minimum overall score for perception is 10 while the maximum overall score is 50. The overall level of perception of the caregivers was interpreted from the 5 points Likert scale to a two-point scale of negative (1-3) and positive perception (3.1-5.0); as a total score: negative (10-30) and positive perception (31-50).

Ethical approval was obtained from the Ethics Committee of the four hospitals involved while informed consent was obtained from each subject.

Data collected were entered into the IBM Statistical Products and Servicing Systems (SPSS) version 20.0 spreadsheet and analyzed. The results obtained were presented as frequency counts, percentages, means and standard deviations, bar- and pie charts. Relevant inferential statistics like Spearman's rho and Pearson's Correlation were also used. The significance of each test was presumed for p -value < 0.05 .

Results

Six hundred and thirty-two subjects were studied. Their ages ranged between 16 and 60 years (mean of 31.6 ± 6.5 years). More than half (52.4%) of the caregivers had a tertiary education while 36.9% had secondary education. Those that had primary or no formal education made up 10.8% of the respondents.

Of the total caregivers, 158 representing 25% had a high level of knowledge concerning accidental childhood poisoning while 229 respondents depicting 36.2% had a moderate level of knowledge of childhood poisoning. Two hundred and forty-five respondents (38.8%) had a low level of knowledge of childhood poisoning. Low level of knowledge made up the highest percentage of the three categories (Fig. 1).

A few of the respondents wrongly indicated that childhood poisoning is a problem of the developed nations and not that of Nigeria 180 (28.5%). Similarly, 238 (37.7%) of the caregivers responded that poisoning is commoner among children above five years old compared to younger children, and 260 (41.1%) of the respondents held the view that children younger than five years of age usually understand that there is a difference between medicines and sweets (Table I).

The majority of the respondents indicated that some poisonings can occur through skin contamination 379 (60.0%) and through inhalation 444 (70.2%). A huge number 570 (90.2%) are of the opinion that palm oil is a good antidote for most poisons while 537 (85.0%) of the respondents are of the view that distraction of caregivers is a risk factor for accidental poisoning. Similarly, 484 (76.6%) of the respondents indicated that stressful events in the home can enhance the occurrence of poisoning. Also, 554 (87.7%) of the respondents agreed that most poisoning involving children can be avoided while 526 (83.2%) of the respondents indicated that some poisoning can cause permanent organ damage in children (Table I).

Generally, negative perception of accidental childhood poisoning was noted in 185 (29.3%) of the caregivers. The majority 447 (70.7%) of them had a positive perception of childhood poisoning (Fig. 2). When viewed specifically, however in table 1, the respondents had negative perception to some (40.0%) of the statements on the scale including that medicines

should be referred to as ‘sweets’ so as to encourage children to take their prescribed medications (2.95), it is safe to send your child to bring your medications (2.36), it is safe to take your medicines in the presence of your child (2.78) and that left-over alcoholic drink can be safely stored in the refrigerator (2.69). They had a positive perception towards the other six statements (60.0%) on the scale including that kerosene can be safely stored on a kitchen shelf (3.05); dish-washing soap would be harmful when swallowed by a child (4.18); it is important to take note of the number of your medications/tablets before starting to use them (3.92); if a child swallows kerosene, make him/her vomit right away (3.45); by putting medicines on a high shelf, they are safe from a toddler (4.09) and children’s protective services ought to be notified when a poisoning involves a child (3.79) [Table II].

As caregivers’ level of education increased, the level of knowledge of accidental childhood poisoning also increased ($p=0.000$) [Table III]. There is also a significant relationship between caregivers’ educational level and perception of accidental childhood poisoning. In this case, however, the correlation is negative and so the higher the educational level of caregivers, the lower their perception and vice versa ($p=0.000$) [Table III]. The relationship between caregivers’ knowledge and perception of accidental childhood poisoning it showed that caregivers with a high level of knowledge did not show positive perception of childhood poisoning ($p=0.002$) [Table III].

Discussion

The present study revealed that caregivers who had a low level of knowledge of accidental childhood poisoning made up 38.8%. The level of knowledge of the caregivers still require stepping up since adequate knowledge about a given health condition determines the perceived seriousness and perceived susceptibility to the condition. There is, therefore, need for

dissemination of evidence-based information on the prevention of childhood poisoning. A higher perceived threat results in a higher likelihood of engagement in health-promoting behaviours.^{25,26} Thus, one of the most important factors in reducing the dangers and hazards children encounter in their homes or environment is caregivers' knowledge. Knowledge affects behaviours by offering a basis for caregivers' opinion, perception, and eventually how they rear their children.²⁷

In terms of specific issues about knowledge, findings revealed that the response of different caregivers to the statements testing their knowledge is varied. For instance, 41.1% (260) of the caregivers responded that children younger than five years of age usually understand that there is a difference between medicines and sweets while 37.7% (238) of them said that poisoning is commoner among children above five years old compared to younger children. These responses show the lack of adequate knowledge of child development. Caregiver knowledge and subsequent expectations of children impact how caregivers understand, interpret and react to their children's behaviours.^{28,29} Unrealistic expectations of normative child development may cause caregivers to overrate a child's abilities, which can place children at risk for injury.³⁰ The contradiction between the actual abilities of children and the perceptions or "misperceptions" of childhood developmental abilities by their caregivers is linked to caregivers inadvertently fashioning insecure surroundings for their children during early childhood.³⁰ Inaccurate developmental knowledge likely contributes to caregivers' difficulty recognizing and implementing developmentally appropriate parenting practices, such as supervision. Increased developmental knowledge has been linked to decreased injury risk.^{31,32}

Another response of great importance is that majority (90.2%) of the caregivers indicated that palm oil is a good antidote for most poisons. This response is not only wrong but a risky and dangerous finding. The use of palm oil as an antidote after ingestion of poison is unsafe and thus

unadvisable. It could be deduced that most caregivers would give their children palm oil to drink immediately the child accidentally ingests a poison. What the caregivers attested to here is in consonance with the actions of other caregivers when their children actually ingest a poison.^{5,8,16} Since it is unlikely that a child would gladly drink palm oil, the procedure is usually forcefully done and predisposes the child to aspiration of the palm oil resulting in a condition known as lipoid pneumonitis. The oral administration of palm kernel seed oil locally referred to as ‘Eden’ and of any oil whatsoever will result in the same complication. Lipoid pneumonitis is a condition in which the palm oil or palm kernel oil get into the small sacs (alveoli) of the lungs of the child preventing gaseous exchange and compromising respiration. The condition may be severe enough to require intensive care management and could be fatal.⁸ It is thus a home intervention that must be discouraged.

Furthermore, the current study unveiled that 29.3% of the caregivers had a negative perception towards the prevention of accidental childhood poisoning. Most (70.7%) of them generally had a positive perception of accidental childhood poisoning. The perception of the caregivers is very important as it tends to give a clear reflection or idea of the caregivers with regards to how they would likely behave. Perceptions of poisoning risk impact caregiver poisoning prevention practices.^{33,34} Caregivers implement more effective poisoning prevention strategies when they accurately and positively perceive and anticipate poisoning risk.³³⁻³⁵ For instance, perceived toxicity was associated with putting substances away immediately after use as well as safe storage for some substances.^{33,34}

In considering specific responses to statements on perception, findings showed that the caregivers had a negative perception to some (40.0%) of the statements on the scale including that medicines should be referred to as ‘sweets’ so as to encourage children to take their

prescribed medications, it is safe to send your child to bring your medications, it is safe to take your medicines in the presence of your child and that left-over alcoholic drink can be safely stored in the refrigerator. Similar to the present findings, Morongiello *et al*^{36,37} and Patel *et al*³³ documented that caregivers often have misperceptions of household hazards and poisoning risk. These aspects of negative perception should, therefore, make up the content of any health education message targeted to enlighten the caregivers. The aim would be to make them realize why these actions are unsafe. For example, if medicines should be referred to as ‘sweets’ so as to encourage children to take their prescribed medications, the children in the absence of their caregivers may lay hold of such medicines and eat them up - a process that may result in overdose or poisoning. Similarly, if medicines are taken in the presence of children, they may likely go ahead to take such medicines (if the medicines are within reach) especially when the caregivers are not watching. The main reason is that children like to imitate the behaviour of adults.³⁸ Children copy what their parents or caregivers do, such as taking medication, drinking coloured liquids, clean house, and spray chemicals.³⁹ In their ignorance and innocence, they may get poisoned by ingesting an unprescribed medication or chemical.

The level of knowledge of caregivers significantly influences the perception of accidental childhood poisoning. However, it showed that caregivers with a high level of knowledge did not show the positive perception of childhood poisoning. It is expected that caregivers with a high level of knowledge will also have more positive perception toward caregiving practices. The reverse, however, was noticed in the current study. It is evident, therefore, that there may be factors other than the knowledge that influence perception such as cultural factors. Since the prevention of poisonings clearly improves the quality of health and hence the quality of life of a child particularly, and the community in general, the further enlightenment of caregivers on the

benefits of prevention may improve their perceived benefits and help them to change their behaviour.

There was a significant relationship between caregivers' educational level and knowledge of accidental childhood poisoning. As caregivers' level of education increased, the level of knowledge also increased. There is thus a direct relationship between caregivers' educational level and knowledge of accidental childhood poisoning. This is in consonance with the documentation of Woolf et al¹⁵ that parents who have higher poison prevention knowledge would likely have better behaviours related to poison safety. Usually, formal education broadens the views of those who embark on it and may have contributed here to the knowledge of the caregivers. This finding may perhaps emphasize further the importance of female education in health matters as it concerns children. Female education is a well-established factor that contributes to the survival of young children. It is important to note that highly educated mothers have been found to actively seek out developmental information, via books and physicians, more so than less educated mothers.⁴⁰ In turn, they have more exposure to accurate developmental information which may positively influence their parenting practices, such as supervision.

The present study also revealed that there was a significant relationship between caregivers' educational level and perception of accidental childhood poisoning. High educational level of caregivers did not improve their level of perception. This implies that factors other than educational level influenced their perception of the condition. Perhaps their belief pattern, their culture or what is commonly acceptable among them may influence their perception and pressure them to behave contrary to their knowledge and level of education.

Conclusion

Caregivers with a high level of knowledge on accidental childhood poisoning were few. There is the need for public enlightenment programmes on poisoning prevention, on appropriate first aid should poisoning occur, as well as help disabuse caregivers' minds of certain negative perceptions of accidental childhood poisoning. The establishment of Poison Control Centres (PCCs) to aid in the achievement of this goal would be a step in the right direction.

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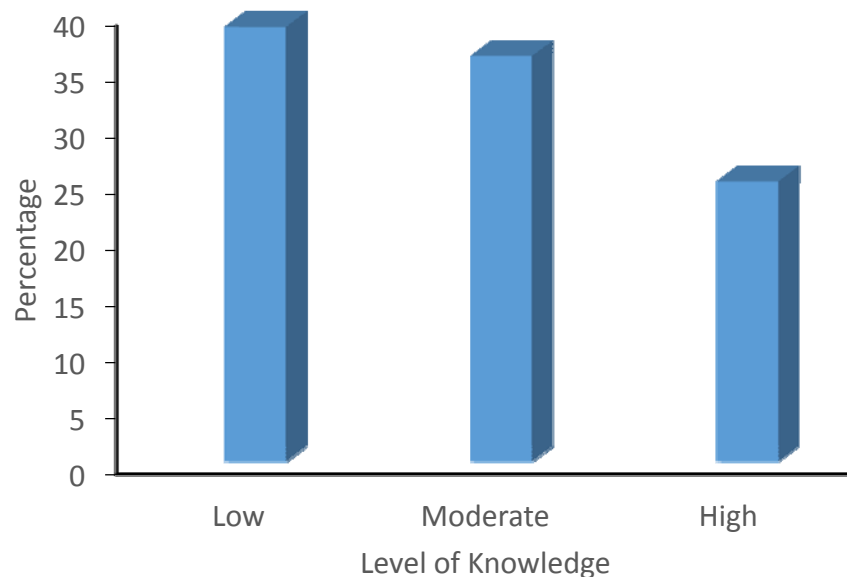


Fig. 1: Level of Knowledge of Accidental Childhood Poisoning among Caregivers

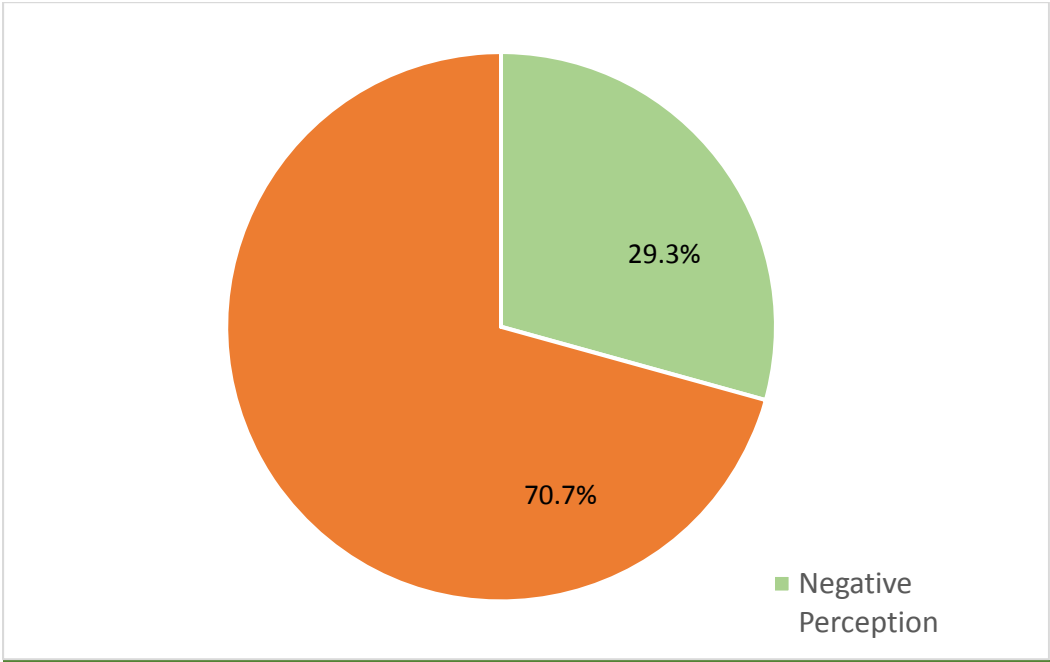


Fig 2: Level of Perception of Accidental Childhood Poisoning among Caregivers

415 **Table I: Caregivers' Knowledge of Accidental Childhood Poisoning**

Statements	True (%)	False (%)
Childhood poisoning is a problem of the developed nations and not that of Nigeria.	180 (28.5)	452 (71.5)
Poisoning is commoner among children above five years old compared to younger children	238 (37.7)	394 (62.3)
Children younger than five years of age usually understand that there is a difference between medicine and sweets.	260 (41.1)	372 (58.9)
Some poisonings can occur through skin contamination.	379 (60.0)	253 (40.0)
Some poisoning can occur through inhalation	444 (70.2)	188 (29.8)
Palm oil is a good antidote for most poisons	570 (90.2)	62 (9.8)
Distraction of caregivers is a risk factor for accidental poisoning	537 (85.0)	95 (15.0)
Stressful events in the home can enhance the occurrence of poisoning	484 (76.6)	148 (23.4)
Most poisonings involving children can be avoided.	554 (87.7)	78 (12.3)
Some poisonings can cause permanent organ damage in children.	526(83.2)	106 (16.8)

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417 **Table II: Caregivers' Perception with regards to Accidental Childhood poisoning**

ITEM	Mean	Std. Deviation	Decision
Kerosene can be safely stored on a kitchen shelf.	3.05	1.400	Positive
Dish-washing soap would be harmful when swallowed by a child.	4.18	0.880	Positive
Medicines should be referred to as 'sweets' so as to encourage children to take their prescribed medications.	2.95	1.295	Negative

It is important to take note of the number of your medications/tablets before starting to use them.	3.92	0.929	Positive
It is safe to send your child to bring your medications.	2.36	1.152	Negative
It is safe to take your medicines in the presence of your child.	2.78	1.184	Negative
Left-over alcoholic drink can be safely stored in the refrigerator.	2.69	1.260	Negative
If a child swallows kerosene, make him/her vomit right away.	3.45	1.204	Positive
By putting medicines on a high shelf, they are safe from a toddler.	4.09	0.991	Positive
Children's protective services ought to be notified when a poisoning involves a child.	3.79	0.978	Positive

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423 **Table III: Correlation of Caregivers' Level of Education (LOE) and Knowledge, LOE and**

424 **Perception as well as Knowledge and Perception.**

Variable	N	Spearman's rho	p-value
Caregivers' LOE			
	632	0.162	0.000
Knowledge			
Caregivers' LOE			
	632	-0.144	0.000
Perception			
Knowledge			
	632	-0.122*	0.002

Perception

425 **Pearson's r*
