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Full Length Research Paper

Cochlear implanted deaf children with additional disabilities: The mothers' perspective

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The objective of this qualitative study was to evaluate the perspective of mothers, whose children, in addition to being deaf and having cochlear implants, also have additional disabilities. Five mothers participated in this study and semi-structured interviews, together with the children's clinical files were used to gather data and inductive analysis was used to establish themes. The results indicated that mothers were positive about the assessment and diagnostic procedures, as well as the outcomes of having cochlear implants. They reported differing expectations relating to their child's development; however, they also voiced concerns about their children's education and highlighted the need for more intensive rehabilitative support.

Key words: Cochlear implants, deafness, profound hearing loss, additional disabilities, mothers.

INTRODUCTION

For children, who are identified at an early age as having a profound hearing loss, cochlear implants (CI) are considered as the best technology for the acquisition of spoken language. Many studies have indicated normal or near normal language development for children who are identified as having profound hearing loss within the first few months of life, having CI before or around 12 months of age and who are able to attend high quality educational programs (for example, Ertmer and Mellon, 2001; Geers et al., 2003; White, 2006). However, when there are disabilities in addition to deafness, progress with CI varies significantly. There are many factors that affect the outcomes in this group and these present challenges for the professionals who work with them.

Children with additional disabilities are those who

require a statement of educational need, even if they are not hearing impaired (Edwards, 2007; Mulla et al., 2013). In the literature, the incidence of additional disabilities in children who are deaf is estimated to be relatively high, ranging from 25 to 40% (Dettman et al., 2004). It is important to note that the level of the additional disability (or disabilities) may be mild or severe in nature and learning implications vary according to severity (Bruce et al., 2008; Edwards, 2007; Edwards et al., 2006; Pyman, et al., 2000).

Most studies conducted with this group have examined both speech and language ability. It has been emphasized that the severity and presentation of the disabilities can vary widely within these subsets, assessment is challenging and clear outcomes are

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difficult to analyze (Nikolopoulos et al., 2008). Nevertheless, the results of these studies indicated that when additional disability was mild to moderate some development in speech perception, production and development were observed; however, if disabilities were severe, the acquisition of spoken language was prevented (Dettman et al., 2004; Edwards, 2007; Lina-Granade et al., 2010; Pyman et al., 2000; Robinsons and Boyd, 2013).

Although, in order to provide parents and guardians with realistic expectations, it is important to measure the speech-language outcomes of these children, to improve the selection process and to ensure that cochlear implanting is appropriate and provides benefits. McCracken and Turner (2012) questioned the rationale of these studies. They argued that the outcome measure should be of a different nature for deaf children with additional disabilities. They claimed that the severity of intellectual disability would certainly obstruct acquisition of spoken language for some children; thus, the measures that focus on speech perception or intelligibility might be inappropriate outcome measures for this population. Evaluations that focus on psychological well-being and quality of life are therefore more likely to be relevant for this group of children.

There are only a few studies that address the experiences of parents of these children and the impact cochlear implantation has had on their children, as well as the wider family. Wiley et al. (2005) analyzed interviews made with parents of children with implants and multiple disabilities but the focus of this study was on communication outcomes. McCracken and Turner (2012) considered the experiences of the parents of deaf children with additional disabilities in accessing CI services and achieving ongoing support. Twelve children with additional disabilities had been fitted with a CI in their group. The results indicated that for some families accessing audiology assessment for CI was problematic, while for other expectations, access to a qualified teacher of the deaf or to FM amplification were challenging. Those children, for whose implantation was delayed, had a very low level of communication skills prior to implantation and parental expectations were uncertain and unclear. They maintained that deaf children with additional disabilities required at least the same access to services as those deaf children showing typical development. It was also shown that although this group required a higher level of input from qualified specialists, some children received substantially less input, and in some cases no specialist input at all (McCracken and Turner, 2012).

Mulla et al. (2013) focused on the parents' perspective and looked in detail at their experiences of access to, and outcomes from, cochlear implantation for their children. They reported the appreciation of the parents regarding changes in their child's communication and social changes, allowing the child to be more included in family

life. Challenges relating to delays in the assessment process were also reported in this research, as in the McCracken and Turner (2012) study. They also explained the difficulties associated in accessing the technology and perception of some parents as discriminatory.

The use of cochlear implants is also a feasible option for deaf children in Turkey. Studies relating to the Turkish population with cochlear implants, regarding the speech and language development of these children, have indicated good results (Belgin, 2006; Özdemir, 2006; Turan et al., 2012); furthermore, there is also a growing body of research on the academic skills and educational placement of implanted children (Karasu et al., 2011). On the other hand, there is no consensus on the implantation of deaf children with additional disabilities and no studies have been found in the literature relating to deaf children with additional disabilities in the Turkish population. The educational support and placement of children with additional disabilities are unclear and the benefits of implantation have not been assessed. Parental counseling during the implantation process has not been defined and for this special group parental needs have not been established.

Considering the limited amount of research regarding implanted children with additional disabilities, it is important to gain insight into the positive and negative aspects of the implantation decision and evaluation process, education and observed changes in life, in order to provide more accurate information to parents and offer better services to these children and their families. Therefore the objective of the present study was to ascertain the mothers' views of their implanted children with additional disabilities.

METHODOLOGY

In the present study, the methodological approach used for encapsulating the participants' perspectives was a qualitative research design, conducted using semi-structured interviews. The advantage of using a qualitative approach in this study was that it provided a deeper understanding of the experiences and attitudes of the mothers towards the use of CI for their children when they have additional disabilities. The mothers' accounts can be used to generate concepts, meanings and theories, by which their experiences of CI may be further evaluated. Semi-structured interviews enabled the researchers to cover the same topic in all interviews, while providing opportunities to the participants to speak about the significant issues according to their experiences (Creswell, 2005; McCracken and Turner, 2012; Mulla et al., 2013; Thomas, 2003).

Participants

Purposive sampling was used to select participants for whom the research topic was relevant (Creswell, 2005; Thomas, 2003). Among the 23 children with additional disabilities who attended our center, a total of ten children had received cochlear implants. The families of three of these children were found to have changed their contact details and could not be located and a further two were unable to attend to their appointments. The remaining five mothers

Table 1. The demographic data of the mothers.

Mother	Age	Education	Occupation	Monthly income
1	32	Secondary school	Housewife	Minimum wage+child benefit
2	28	Secondary school	Housewife	Minimum wage+child benefit
3	28	Primary school	Housewife	No regular income+child benefit
4	32	High school	Housewife	No regular income+child benefit
5	40	High school	Housewife	2,900 Turkish Lira

Table 2. The demographic data of the children.

Child	Age*	*Age of diagnosis	*Age of HA fitting	*Age of CI	Additional disability	Aetiology
1	116	14	23	55	ASD, MMR	Anoxia
2	49	6	6	13	MMR	Williams Synd.
3	46	9	10	25	ASD, MMR	Unknown
4	44	2	3	17	MMR, ASD	Premature birth
5	39	12	14	24	MMR	CMV

*Age in months. ASD: Autism Spectrum Disorder, MMR: Mental Motor Retardation, CMV: Cytomegalovirus.

volunteered to take part in the study during their annual controls. All children had profound hearing loss, severe cognitive disabilities, as well as developmental delays. Their ages varied from three to nine years. Tables 1 and 2 present demographic data related to the mothers and children in the study.

As can be seen in Table 1, none of the mothers worked outside home and of the five, only one mother used to work as an accountant before the birth of her child; however, following her son's diagnosis with CMV, she had to leave her job to manage his health issues. During the data collection, two of the fathers were unemployed; they received support from their extended families. All the families had state support, which in Turkey is provided for children with special needs. The data indicated that all families in the study were from the low-income group.

As can be seen in Table 2, hearing loss was diagnosed within the first six months of life in two children and one child was born before newborn hearing screening became a regular procedure in Turkey. In this case, his family had suspected hearing loss when he was around eight months of age and diagnosis was established at 14 months. Although one child had actually passed the screening test for otoacoustic emissions (OAE), hearing loss was eventually diagnosed at 12 months and subsequent evaluations involving auditory brainstem responses (ABR) indicated auditory neuropathy spectrum disorder. The other two children were diagnosed and fitted with hearing aids prior to their first birthdays.

Data collection

The study was conducted in Anadolu University, Research and Education Center for Hearing Impaired Children, Eskişehir, Turkey. Various sources were used to collect data. The mothers were interviewed using a semi-structured format. The questions were about the assessment process, educational support, observed outcomes of CI and significant issues, according to their experiences. The interview questions are presented in Appendix A. Participants met with the author at the clinic before the parent guidance session or their child's regular audiology control. All

interviews were video recorded and each lasted between 30 and 45 min. The children's clinical and educational files were used to collect demographic data.

Analysis of the data

The recordings of the interviews were transcribed, coded and an inductive data analysis was carried out, allowing the major categories and themes to arise from the data. The reason for using an inductive approach was to establish clear links between the research objectives and the summary findings derived from the raw data. Some of the assumptions, which can be seen as underlying the use of a general inductive approach, are described below (Thomson, 2003):

1. Data analysis is determined by both the research objectives (deductive) and multiple readings and interpretations of the raw data (inductive). Accordingly, the findings are derived from both the research objectives outlined by the researcher(s) and findings arising directly from the analysis of the raw data.
2. The primary mode of analysis is the development of categories from the raw data into a model or framework that captures key themes and processes judged by the researcher to be important. The research findings result from multiple interpretations made from the raw data, by researchers who code the data. Inevitably, the findings are shaped by the assumptions and experiences of the researchers who conduct the research and carry out the data analyses. In order for the findings to be usable, the researcher (data analyst) must make decisions about what in the data is more or less important.
3. Different researchers are likely to produce findings that are not identical and have non-overlapping components.
4. The trustworthiness of the findings can be assessed using a range of techniques, such as (a) independent replication of the research, (b) comparison with findings from previous research, (c) triangulation within a project, (d) feedback from participants in the research, and (e) feedback from users of the research findings.

Trustworthiness

Involving an independent researcher in the analysis of the data ensured that these categories and themes were not subject to the perspective of an individual researcher. Two of the parents, who were willing to participate in the analysis, also read the transcriptions and approved the transcriptions and themes.

FINDINGS

Analysis of the data revealed six major themes relating to the interview questions and the mothers' narratives: Experiences concerning assessment and diagnostic procedure, positive outcomes with CI, educational issues, support from relatives, expectations as perceived by the mothers, relating to the children's development and needs.

Assessment and diagnosis procedure

All the parents reported that they had to attend the hospital several times for a diagnosis of both hearing loss and additional disability. They all mentioned the first year of their child as being 'exhausting' both emotionally and physically.

"I used to go to the hospital, sometimes three times in a week. I had to change public buses a couple of times to get to the faculty's hospital from where I lived. When we reached there he would not fall asleep for testing to be done because of his condition. There were irregularities in his sleeping pattern during his first year. I remember sleeping only 2 to 3 h most nights and he used to cry a lot (m2)."

"Right after his birth we were on the buses. Going from one hospital to another, looking for a cure of CMV and later for hearing loss (m5)."

They all appreciated that the audiological process had gone smoothly apart from a few repeated tests. They were all guided towards CI at an early stage by the audiology clinic they attended. But some complained about the negative attitudes of some medical doctors concerning the implantation of children with additional disabilities.

"The neurologist in fact delayed us both for the hearing aid fitting and implantation. She did not approve the papers for the operation. Teachers from the research institute on disabled children kept writing reports. She made us wait until he was four years old. If he had his implant earlier he would be better off (m1)."

"On the final phase of the assessment the psychiatrist confused me. I heard him talking to his colleagues and saying that B's disabilities were so severe and he would

be better if he had not the surgery at all. I talked to our ENT about it. She said if he does not have an implant he would have no possibility to access sound. With the implant at least he would be able to hear sounds even if he would have no speech (m2)."

Outcomes of the CI

All the mothers reported responses to sound and an increased awareness of the environment. They said implant had radically changed their child's life.

"He responds to my voice wherever he is. He started to watch TV. If he sees anything he likes; he claps his hands. He smiles more (m2)."

"We did not see much difference at first. But in time he started looking around. He is more interested in the environment now. He smiles more. He wants to go out. Before CI he never wanted to go outside or see other children (m3)."

"Before the implant it was like she had a life of her own. I was trying to get in to her world. But I guess she only let me in from a narrow path. Now she has become more involved in life. She wants to play with her peers, wants to share, she watches my face until I finish my sentence (m4)."

Two of the mothers suggested a sense of increased security.

"He started to recognize people after the CI. He used to go with anyone who shows him a mobile phone. Now he looks at the person and if he does not know him he turns his back and comes to me (m1)."

"He loves motorbikes. If someone invites him for a ride he would have gone with him. He recognizes strangers now (m3)."

Three mothers reported some understanding with the help of visual cues and one mother said that the child has ten words and sound imitations to express her basic needs in the home. All the mothers reported increased vocalization.

Education

All the children had support from teachers of the deaf. At the time, four of the children had two hour long sessions of special education per week. One of them had also started kindergarten for two hours per day within a regular school. The oldest one attended a school for children with mental disabilities with support from a teacher of the deaf. Four of the children had weekly

physiotherapy sessions for their physical development and support. The mothers mostly expressed their satisfaction from the weekly support; nevertheless, some voiced problems relating to the school their child attended.

"He attends a school for mentally disabled children. It is his 4th year. The first two years were a bit messy. Regular classroom teachers taught in preschool. Later a teacher for the mentally disabled was assigned for his classroom. I asked the principal if we could get a teacher of the deaf. He advised me to write to the ministry of education. Now we have our teacher of the deaf. Both teachers work together in the class. The teacher of the deaf has made a big difference for him...now he follows writing lines... does painting... he has learned colors.... (m1)."

"K is very happy in the nursery... but his teacher has created a few problems... to be frank, she does not want him in her class... she spoke with the principal to minimize his hours in the class... and she makes me wait in the school in case anything happens... and I go there every day to wait for two hours. If she says wait for four hours I wait for four hours, if it is five hours I wait for five hours... She won't be able to discourage me. I said, "you are showing me the door, you want my child to leave the school,"... they said "no, no, we don't want you to leave, but in case of any trouble you should be in the school." My child does not do any harm to anyone ... (m5)."

Emotional support

Four of the mothers reported having support from their spouses and family members. One mother had no support at all.

"... Without my husband I would not be here in the first place. If we did not support each other S would not be what he is now. In K (the city where they lived) I know children who could be much better off than S. Their capacities are larger than S ... but they are delayed more than him since their parents did not accept their condition. Either mother or father... one of them leaves their family... (m1)."

M1 also described her communication with the mothers of other disabled children as being more meaningful and satisfying than her other friends and family members.

"...because...we all share same concerns...I can't feel the same with other friends in my village... they usually talk about their children's abilities, which my child doesn't have... when we come together with other mothers in his school, we usually talk about the activities we might do for their progress (m1)."

"I was on my own by that time. My husband had had a traffic accident at that time and had also undergone

surgery. We also had no relatives living nearby. I still do everything on my own (m2)."

"My mother in law helps me a lot. When I do housework she looks after B. Since I injured my knee she also takes him to the rehabilitation center. He is too heavy now. I can't carry him around in my physical condition... (m3)."

"My parents and my sister were by my side all the time. My husband needed sometime to accept E's condition. He stood away for a while (m4)."

"When we first came here (to the university clinic) I was expecting different things.... like you would say that the diagnosis was wrong, and would confirm normal hearing.... when we got the same results I had a great disappointment. I cried for days.... I could not stop myself... Then I wanted to move here to get educational support. My husband didn't agree with that because of his job. We really had a difficult time, lots of quarrels. I kept crying... could not cook for days... I don't know... it was a constant sorrow...then my husband understood that I was not good we started to look for solutions... during those times our families were always with us... and friends ... our families and friends visited us frequently... They never left me alone... those days were very hard.... Acceptance is a big step. When you accepted the things they become easier. After that we started to look for things we can do for K. How could he be better off? We wanted him to live on his own, without needing us.... So we started to work on that (m5)."

Expectations

All the mothers were seen as hoping for a more physically independent child. At the time of the data collection only the oldest child (c1) was able to walk without support. The others were all in need of varying degrees of physical help in order to move around. One child was not able to support his neck or sit unaided.

"I want him to walk. I hope he says "mother" and speaks...at least some words to express himself. I hope he will not be in need of anyone. I hope he will get his needs on his own (m2)."

"The neurologist says he will be able to walk because he has started to sit. He walks by holding around now if he wants to.... I hope he can walk (m3)."

One mother reported her expectations, as her child attaining normal development and attending regular schools.

"If we can control her behavior problems, I believe she will become normal gradually over time... As our

neurologist says... she will catch up with her peers in future... it is my hope that she will start special education school first. Then in time she can go to any school as she wants (m4)."

In contrast one mother expressed low expectations when considering her child's future.

"What do I expect? Nothing much really... I hope he will learn to take care of himself... he had toilet training but if I don't take him he wets himself... he still needs to discriminate strangers from the family. A job? Very difficult... may be something like carrying the things around in an office... (m1)."

Perceived needs

The mothers reported different needs.

"I wish I could have get some more spiritual support. I sometimes feel very lonely. Even the closest people in our lives cannot understand our condition ... Normal children wander around and talk... though S sits quietly and plays with a mobile phone or a computer... or watches a washing machine and everyone says he is okay now. But he is not. We have worked a lot with him, been to hospitals, rehabilitation centers and yet we still have troubles... it is very difficult... (m1)."

"If I had support for housework, that would have helped me a lot. I have to look after his sister and my husband as well... and do the all work at home. If I had someone for help I would have spent more time with B (m2)."

"I think we need more sessions in rehabilitation. We only have 45 minutes in a week. It would be better if he had more sessions or daily support (m3)."

"...for instance we were going for physiotherapy...no transportation was provided. It was very difficult... since she doesn't walk I had to carry her... it made my arms weak and vulnerable. We could not establish a warm relationship with the physiotherapist either... however in the rehabilitation center all of the staff are lovely... they have been very positive to us... They never made us feel bad by criticizing... instead they corrected our mistakes by showing the right way... smiling faces and warmth are the best treatment for us... (m4)."

"We need quality special schools in our district as well. We came here because in our town there is no special school for our child. When he started kindergarten with normal children I thought that he found his place and I might have some time for my own. But they didn't want him in the classroom and we faced lots of problems with the teacher. They still make me sit there all the time. We

want our children to get a good education but no one is interested in us... Implant maintenance is also very expensive. We don't get enough state support for the replacement parts (m5)."

DISCUSSION

The narratives provided by this group of mothers enabled us to share their perspectives and experiences. The results of these interviews indicated that the early months were difficult with differentiations in terms of the needs and development of their child. Parents faced a new world of terminology, many visits for medical appointments, and frequent testing, to establish the hearing status of their child. The child's care routines extended well above what was typically expected. The early years were therefore unlike that of typically developing children who are deaf, where parents are usually focusing on the identification of deafness and the implications this may have for their child and family (Mulla et al., 2013).

Although these were difficult times, none of the parents reported having professional support. It seems that their social network provided the necessary assistance both physically, like sharing the housework, or psychologically, like providing empathy during these hard times. It appeared that they did not get any official aid, either, during their child's first year and they had to deal with every obstacle on their own. A lack of trained professionals may explain the inadequate service. It could be suggested that parent support groups are formed to provide more organized support for families immediately after the diagnosis, to help deal with the unsatisfactory professional support and, as explained by one of the mothers in the study, it could also be encouraging for the parents to connect with someone who shares the same problem. This area still needs to be explored but it might be a solution for developing countries such as Turkey, where there are limited human and material resources.

On the other hand it is reassuring that the children in the present study were aided around their first year of life, apart for the oldest one, who was born before the hearing screening program was established in Turkey. The young ones also had their cochlear implants before or around their second birthday, which provided earlier access to sound and this could enhance their chances of improving their communication skills and quality of life. These results draw a more optimistic picture than earlier studies, which described more complications in the audiological evaluation and significant delays in access to hearing technologies (Nikolopoulos et al., 2008; McCracken and Turner, 2012; Mulla, et al., 2013; Robinson and Boyd, 2013). However it should be noted that the results of the current study were only established from one center and are limited when representing the wider population.

When taking additional hearing technology into

consideration, none of the children in this study used FM systems in daily life. One of the most common problems within the Turkish system is that social security does not cover the payment of FM systems for deaf children. They are vital in noisy and crowded situations for children with hearing loss to get better understanding of speech and it is even more vital for children who have limited cognitive skills to have FM systems (McCracken and Turner, 2012; Robinson and Boyd, 2013); otherwise, identifying signals in an interruptive environment can be impossible for these children.

Attitudes of professionals are found to be affecting parental susceptibilities. Some parents complained about the disapproving attitudes of professionals during the evaluation for implantation. It is possible that, when a child's disabilities are severe and that spoken communication is an unlikely outcome, any amplification may be viewed with some skepticism (McCracken and Turner, 2012). Professionals may feel that providing CI is unnecessary when considering the complexities in the child's development. This point of view perceives amplification as being only for language acquisition; nevertheless amplification is also a way of connecting an individual to their environment. As a result of hearing being provided by amplification, the children can attach meaning to events and gain information about his/her surroundings. Such access may help to provide a sense of integrity, and predictability. It may potentially help to soothe a child, provide comfort, and a sense of well-being (McCracken and Turner, 2012; Mulla et al., 2013) and the findings of this current study support that view. All mothers in our study reported positive changes in the children's behavior, more awareness of the environment, an increased sense of communication and more connectedness for the child.

The parents also reported satisfaction with the level of rehabilitative support they currently had; however, it seems that when the children started school problems occurred. Only two children in the present study attended a school: one was at a special school for children with mental disabilities and the other was at a regular nursery. Both mothers described the schools' various difficulties. On this issue the Turkish educational system is quite blurred, leaving parents alone in terms of getting the necessary support for their children, inevitably resulting in further disadvantages for them. This group of children requires an individualized and structured approach to supporting the development of communication and listening skills, as well as to improve their cognitive skills. It is therefore not surprising that regular classroom teachers who had no experience or information on the educational needs of children with multiple disabilities had problems with the management of the child in the classroom, as well as problems with the parents. Teachers require clear information regarding the use of the CI, and on-going support for these children's education. When a child is deaf and has additional

disabilities, the involvement of multi-professional teams is necessary. It is important that, to ensure that services are child centered and complementary, a holistic view is taken of both the child and the family's needs (Mulla et al., 2013). With this group, audiologists need access to the growing body of research regarding the use of CI. Similarly, teachers of the deaf should be aware of the research and apply their specialist skills to all deaf children, regardless of the additional needs (Edwards, 2007; McCracken and Turner, 2012; Mulla et al., 2013).

With regard to their children, the expectations of parents appeared to concentrate on physical independence with only one mother expressing concern for the adult life of her son. She is the mother of the oldest child and it is possible that she had observed and experienced more in relation to the atypical development of her son. The other children are still very young and the mothers may still hope that their child could achieve typical developmental patterns. Indeed, one mother in the group even expressed her expectation that her child would close the gap with typically developing children and attend any school she wanted. Bearing in mind that all the children in this study had severe cognitive and developmental delays, her hope is unlikely to become a reality. It is likely that some of these children will need lifelong care and support; however, the mothers either seemed unaware of this reality or possibly could still be in the denial stage and unable to face up to it. It might be helpful to remind the parents and explain their child's situation in special sessions, which are sensitively designed and take the parents vulnerability into consideration, in order to provide better understanding and insight regarding their child's condition.

The finding of this study implies differing needs in parents; some required more emotional support while others were more concentrated on educational aspects. It was interesting to note that none of the mothers were seemed worried about their children's hearing capabilities. They seemed quite satisfied with the sound provided by the cochlear implants and their enhanced communication following the implantation and more focused on the other disabilities. This finding is further encouragement for the benefits of implants in cases children with additional disabilities to deafness. They all required more frequent rehabilitation sessions in terms of disabilities other than deafness. One parent who had a negative experience with the regular school voiced the need for special schools for her child.

As already mentioned, the educational aspects of these children are still unresolved. The current policy is either to place these children in regular classrooms with their typical developing peers or in deaf schools. However, if good support for the classroom teacher is not provided, this educational placement may not be suitable for children with severe cognitive and motor delay. Therefore, some other educational placements should be designed. It is obvious that education for these children

requires teamwork and schools for children, who have severe cognitive delays, are an option together with support from a teacher of the deaf in order to improve this group of children's quality of education. It is also possible to provide specialized teachers, to teach children with other disabilities attending deaf schools. It is also important to train the audiologists with whom the majority of families have initial contact in cases of hearing loss. They should recognize that this group is not a small minority but a significant group that requires an informed professional approach (Edwards, 2007; Mulla et al., 2013).

Overall, the results of this current study imply that even though the children in the study have severe disabilities, they have made use of CI. Clinical evaluations have indicated that they respond to the environmental and speech sounds even though they lacked expressive language. The mothers' statements support the clinical findings and describe the benefits they observe during their daily lives. These results are encouraging while deciding on CI for this group, particularly in countries like Turkey, which has no clear consensus on the decision making process and have only limited resources. It is recommended that educational services should be evaluated in detail with further studies and strengthened to maximize the benefits of implantation, instead of simply not offering implants to this special group. It also should be noted that the families in the study were in a low SES group. They were pushing the limits to get educational support and the expenses for CI and were highly cooperative with the professionals. The determination of these parents to provide a better life for their children should also be considered, while deciding on implantation and the provision of support.

Conclusion

It can be argued that the needs of cochlear implanted children with additional disabilities, as well as their families, are different from those of children who only have hearing loss. The schooling of these children seems problematic, lacking the provision of support in different areas of development, as well as the necessary support for listening and language development. On the other hand, during their preschool years, increasing the amount of rehabilitation sessions and providing support at home may help to develop the relationship between the families and their children. It can also be suggested that offering training to parents, psychologists, social workers and educators, in order to provide emotional support, in groups as well as in individual sessions, will help parents to cope with their feelings of loneliness.

Conflict of Interests

The authors have not declared any conflict of interests.

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APPENDIX A

- 1) Can you describe the assessment process for hearing loss?
- 2) Can you tell me about the negative and positive aspects of the evaluation process?
- 3) How cochlear implants affected your child?
- 4) Could you tell me about the emotional support you get?
- 5) Where does your child get education? Could you give some information about the educational support you get?
- 6) What are your expectancies related to his/her future development?
- 7) Anything you would like to talk about or elaborate?

Full Length Research Paper

Prevalence of hypertension and associated risk factor among interstate commercial drivers in Jabi Park Abuja

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Commercial drivers are a 'high-risk' population where fitness on duty is important in enabling them to adequately respond to their job responsibilities. This study was carried out to determine the prevalence of hypertension and its risk factors among the interstate commercial drivers in Jabi Park, Abuja. A cross-sectional study with 389 inter-state commercial drivers at Jabi Park in Abuja was conducted. A structured interviewer-administered questionnaire was used to collect information on socio-demographic characteristics, driving patterns, physical activity, dietary habit, tobacco-use, vision, alcohol consumption and practice of periodic health checks. Respondents' blood pressure (BP), waist circumference, hip circumference, body weight and height were measured. Fasting blood samples were collected for cholesterol and blood glucose estimation. Data was analyzed using descriptive statistics, Chi square and logistic regression at $p < 0.05$. The prevalence of hypertension (BP > 160/95 mmHg) was 9.0%. Hypertension was found among 19.9% of those obese. Ninety-nine percentage of the respondents had hyperglycaemia and of this 51.0% had hypertension. 2.3% of the respondents were smokers and 3.9% took alcohol. There was positive correlation between hypertension and body mass index (BMI; $r = 0.8$). Multivariate analysis, after controlling for age, revealed that obesity (BMI ≥ 30 kg/m²) (AOR=6.2; 95%CI=1.9-20.7), Waist-hip ratio > 0.95 (AOR=6.4; 95%CI=1.5-27.0), family history of hypertension (AOR=4.1, 95%CI=1.9-8.0) and hypercholesterolemia (AOR=4.0; 95%CI=1.2-13.2) significantly predicted occurrence of hypertension. There is high prevalence of hypertension among commercial drivers in Jabi Park and this is attributed to lifestyle factors. Thus, workplace interventions to address the risk factors identified in this study are crucial for preventing mortality and morbidity due to hypertension.

Key words: Prevalence, risk factors, hypertension, commercial drivers, Abuja.

INTRODUCTION

Hypertension is a leading risk factor and primary contributor to Cardiovascular Vascular Disease (CVD).

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In 2000, 972 million people were reported to have hypertension, a prevalence rate of 26.4% and this number is expected to increase to 1.54 billion by 2025 (Kearney et al., 2005). In sub-Saharan Africa, the overall prevalence of hypertension in 2008 was estimated at 16.2% (95% CI: 14.2 - 20.3) and in the Africa region, about 74.7 million (95% CI: 65.2 to 93.4 million) individuals were estimated hypertensive (Ogah, 2006, 2012).

In addition, a review undertaken in Nigeria in 2012 found the overall prevalence of hypertension ranged from 8 to 46.4% depending on the study target population, type of measurement and cut-off value used for defining hypertension (Ogah et al., 2012).

In developed countries such as the United States, hypertension has been found to be a largest contributor to cardiovascular mortality. Furthermore developing countries such as Nigeria face enormous challenge posed by the social and economic effects of increasing morbidity and mortality due to CVDs (Lopez et al., 2006; Gersh et al., 2010). NCDs affect populations that are still economically active such as truck drivers.

Statistics show that diseases that were initially prevalent in high income countries are increasingly becoming prevalent in middle and low income countries. This is attributed to globalization and industrialization which lead to lifestyle changes including consumption of highly refined food rich in fat and sugar (energy dense food), reduced physical activity and increased exposure to stress (Go et al., 2014). This transition has led to the emergence of NCDs including hypertension, diabetes, cancers and other related conditions.

Many studies conducted in developing countries especially in Africa have looked at truck drivers' sexual health in relation to HIV/AIDS. Lacking are studies that look at the prevalence on non-communicable diseases and their risk factors among this population especially in developing countries, (Lawoyin et al., 2002). Studies elsewhere have shown that truck drivers including other workers whose occupation is professional driving are at a higher risk of ischemic heart conditions (Go et al., 2014; Lawoyin et al., 2002; Netterstrøm and Suadicani, 1993; Sangaleti et al., 2014). The higher risk of NCDs may be explained by the inherent prevalence of risk factors in this population. The conditions that truck drivers work under create a favorable environment for the development of NCDs such as hypertension. These include sedentary lifestyle, poor diets, poor access to health care and stress. In addition all these risk factors may contribute to obesity which is another important risk factor for hypertension.

Studies have looked extensively at the risk factors for hypertension. Meanwhile road accidents are also a major public health concern in Nigeria. As at 2001, Nigeria ranked second on the weighted scale of countries with very high road traffic crashes (Ghaffar, 2013). Over 7,000 Nigerians die every year from road traffic crashes

(FRSC), over 26,000 injuries were recorded at same period and from 2000 to 2002, the annual death toll from road crashes in Nigeria recorded more than 8,400 from about 17,000 road crashes. This is an average of one death in every two crashes nationwide. A total of 208,361 cases of road traffic crashes were recorded by FRSC from 1990 to 2001, these resulted in 81,657 deaths and 238,573 people injured (Chidoka, 2013). Commercial drivers cause 40% of RTAs in Nigeria, (Chidoka, 2013). Commercial drivers undergo high stress, their diets are not controlled, smoke while on the wheel, drink alcohol before driving, may be drunk while driving and may not have time to do one medical checkup, (Chidoka, 2013). Some are already on treatment for hypertension but are not adherent to anti-hypertensive treatment while they still drive passengers and putting them at risk of losing lives. Hypertensive encephalopathy has led to many auto-crashes and many deaths among drivers and passengers (Akanbi et al., 2009).

However considering the importance of commercial drivers on the economy, it is therefore imperative to look at prevalence of hypertension as well as its risk factors in this population. The results would provide important information to be used at personal, community levels and workplace levels. Such information could be used to develop intervention strategies targeted at the prevention of hypertension and the promotion of the general health and well-being of these commercial drivers.

MATERIALS AND METHODS

A descriptive cross sectional study that was carried out in Jabi Motor Park, located in Utako area of Abuja municipality. It is the largest park in Federal Capital Territory (FCT) and services all routes to the various states of Nigeria from Abuja. There are about 2378 registered commercial drivers in Jabi Motor Park. The Jabi Motor Park has many food vendors, and there are other traders selling cigarette and alcoholic drinks.

The study population included interstate commercial drivers travelling from Abuja to and from the 36 states of the Federation. All interstate commercial drivers who were 18 years old and above, registered with the National Union of Road Transport Workers in the park at time of study were included in the study. Drivers below the age of 18 years, private motor drivers, drivers without licenses and non-consenting drivers were excluded from the study. Systematic sampling technique was used to select 414 subjects from the register in which 2738 commercial drivers were recorded. The study population (2378) was divided with the sample size (414) to get the sampling interval of 6.

Interviews using a pretested questionnaire collected data on socio-demographic characteristics, driving patterns, physical activity, dietary habit, tobacco-use, vision, alcohol consumption and practice of periodic health checks. It was reviewed by a senior colleague in the Department of Epidemiology and Medical Biostatistics, Faculty of Public Health, College of Medicine, University of Ibadan. In addition, measurements such as blood pressure, weight, height, waist circumference, hip circumference were taken. Fasting venous blood samples were collected for cholesterol and blood glucose estimation. Data was collected between February and April, 2013. The individual interview took between 10 to 20 min to complete. Respondents that were found to be hypertensive and diabetic without prior knowledge of their health

status were provided with medications to reduce the blood pressure and blood sugar level and were eventually referred to health clinic and hospital of their choice.

Blood pressure measurements

Blood pressure was taken on the left upper arm using a sphygmomanometer cuff. The BP was taken only two times with intervals of two days instead of three times with interval of 3 to 4 days, (JNC, 2014). Blood pressure was measured using mercury Accoson sphygmomanometer. The measurements were taken in the sitting position with exposed outstretched right arm on a table after resting for at least 5 min, using appropriate cuff size, the cuff bladder completely encircling the arm covering 75% of the arm between the acromion and olecranon. The bell of the stethoscope was placed over the brachial pulse at the proximal medial part of the anti-cubital fossa. For each measurement, the cuff was rapidly inflated to occlude the brachial artery, and then deflated slowly allowing the mercury column of the sphygmomanometer to fall at a rate of approximately 2 to 5 mm Hg per second. The first Korotkoff sound was taken as systolic BP and the fifth Korotkoff sound as the diastolic BP. Blood pressure was measured twice for each person in the same sitting with at least two minutes interval between measurements. The average of the two measurements was then estimated as the blood pressure level of the subject. For those with a raised BP, two additional BP measurements were made at least a week apart. Hypertension (HTN) was defined as average of two measurements of systolic and/or diastolic BP that is $\geq 160/95$ mmHg or self-reported treatment of hypertension with antihypertensive medication taken in the past 2 weeks (Whitworth, 2003).

Height was measured with respondents standing on bare feet on a height meter RCZ-120, with their backs against the calibrated stadiometer. The flat bar was moved downward till it touches the head and height recorded to the nearest 0.1 cm, (JNC, 2014).

Weight was measured using a calibrated and standardized weighing scale (RCZ-120) put on a flat surface. The respondents were asked to remove additional clothing like hats, empty their pockets of coins and keys, remove wrist watch or heavy jewelry. The measurement was taken to the nearest 0.1 kg and recorded, (JNC, 2014).

Body mass index

The BMI was classified using height and weight according to the criteria of the World Health Organization (WHO) as: underweight (BMI: <18.5 kg/m²), normal weight (BMI: 18 – 24.9 kg/m²), overweight (25 to 29.9 kg/m²) and obese (>30 kg/m²) (Akanbi et al., 2009; WHO TRS, 2000; WHO Expert Consultation, 2004).

Waist circumference

Waist circumference was measured using a flexible, non-stretchable tape with the subject standing erect with relaxed abdominal muscles (expiration), arm at the side and feet together. The waist circumference was measured at the level of umbilicus to the nearest 0.5 cm. The measurement was taken at the end of a normal expiration (Al-Lawati and Jousilahti, 2008).

Hip circumference

Hip circumference was measured at the point of greatest circumference around hips and buttocks, level of the anterior iliac spine, to the nearest 0.5 cm. Measurements were taken with a flexible, non-stretchable tape in close contact with the skin, but without indenting the soft tissue (JNC, 2014).

Waist hip ratio

Waist hip ratio classification was as follows: normal (W/H: <0.90), overweight (W/H: >0.90 - ≤ 0.95) and obese (W/H: >0.95) (Al-Lawati and Jousilahti, 2008).

Measurement of fasting blood sugar

Fasting blood sugar was measured using a glucometer. A fasting 2 drops of blood sample was taken after maintaining sterility. The middle finger was cleaned with alcohol spirit swab. A lancet was used to prick the finger and 2 drops of blood were made to fall on the test strip and the result was read within few minute after collection of blood sample (Al-Lawati and Jousilahti, 2008).

Measurement of fasting blood cholesterol

Two methods were used to measure blood cholesterol and this was to maintain quality and accuracy of result:

- Spectrophotometer method: The procedure was carried out under aseptic condition. A 5 ml needle and syringe was used to carry out venepuncture on each respondent at the cubital veins. The samples were taken to the laboratory in an ice pack to avoid hemolysis (Allen et al., 2010).
- Lipid pro-meter machine and method: Lipid profile meter test strips were inserted into the machine, the middle finger was cleaned with spirit swab. A lancet was used to do needle prick for 2 drops. The 2 drops fell on the test strip and the result was read within few minutes after collection of blood sample. The result showed the lipid profile high density lipoprotein, low density lipoprotein, triglycerides and total cholesterol, respectively (Lipidpro INFLIOA, 2013).

Data analysis

Data was entered into Epi info 7. All the data were cleaned before analysis was carried out. Descriptive statistics such as means, proportions, percentages and range were used to summarize the data and analytical statistical tests were carried out to test associations. Bivariate analysis (Chi square) and multivariate logistic regression were performed to identify significant predictors of hypertension and level of association was judged significant at $p<0.05$.

Ethical approval

Ethical approval was granted by the Health Research Ethics Committee of the Federal Capital Territory in Abuja. Written informed consent for the study was sought from the respondents after the purpose of the study was explained. Confidentiality of the information was ensured by not using names of the respondents on any of the study documents. There was no monetary compensation for this study. Each respondent was given a dustbin basket for his vehicle and the results of the investigations were provided to them.

RESULTS

Socio-demographic characteristic of respondents

A total of 398 drivers participated in the study and the response rate was 96.0%. About 33% of respondents

Table 1. Socio demographic characteristics of respondents (N=398).

Characteristic	Frequency	Percent
Age group		
16-25	34	8.6
26-35	132	33.2
36-45	128	32.2
46-55	81	20.4
56-65	20	5.0
66-75	2	0.5
Marital status		
Single	78	19.6
Married	319	80.2
Divorced	1	0.3
Numbers of children		
>4	275	69.1
≤4	123	30.9
Educational status		
None	21	5.3
Primary	140	35.2
Secondary	183	46.0
Years of driving		
<5	63	15.8
5-10	119	29.8
11-15	52	13
16-20	53	13.3
21-25	31	7.8
26-30	27	6.8
>30	53	13.3

were in the age group 26 to 45 years and their mean age was 39.0 ± 10.0 years with a range of 18 to 68 years. All respondents were males. Out of 398 interviewed, the majority 323 (80.6%) were married, 66 (16.0%) had more than one wife and 274 (69.0%) had more than four children. Many of the respondents 183 (46%) had secondary school education and 140 (35.2%) primary school education (Table 1).

Health profile

A total of 191 (48.2%) respondents reported being in good health while 4(1.0%) reported poor health, 21 (5.2%) reported they were hypertensive, 30 (7.5%) had diabetes mellitus and 34 (8.5%) had eye problems. A total of 87 (18.75%) reported a family history of hypertension of which 18(4.5%) had hypertension themselves and 39 (9.1%) had family history of obesity. Most respondents 277 (69.5%) had never had a medical

checkup in any health facility while only 121 (30.5%) drivers had 'ever' received a health screening.

Prevalence of hypertension among the respondents

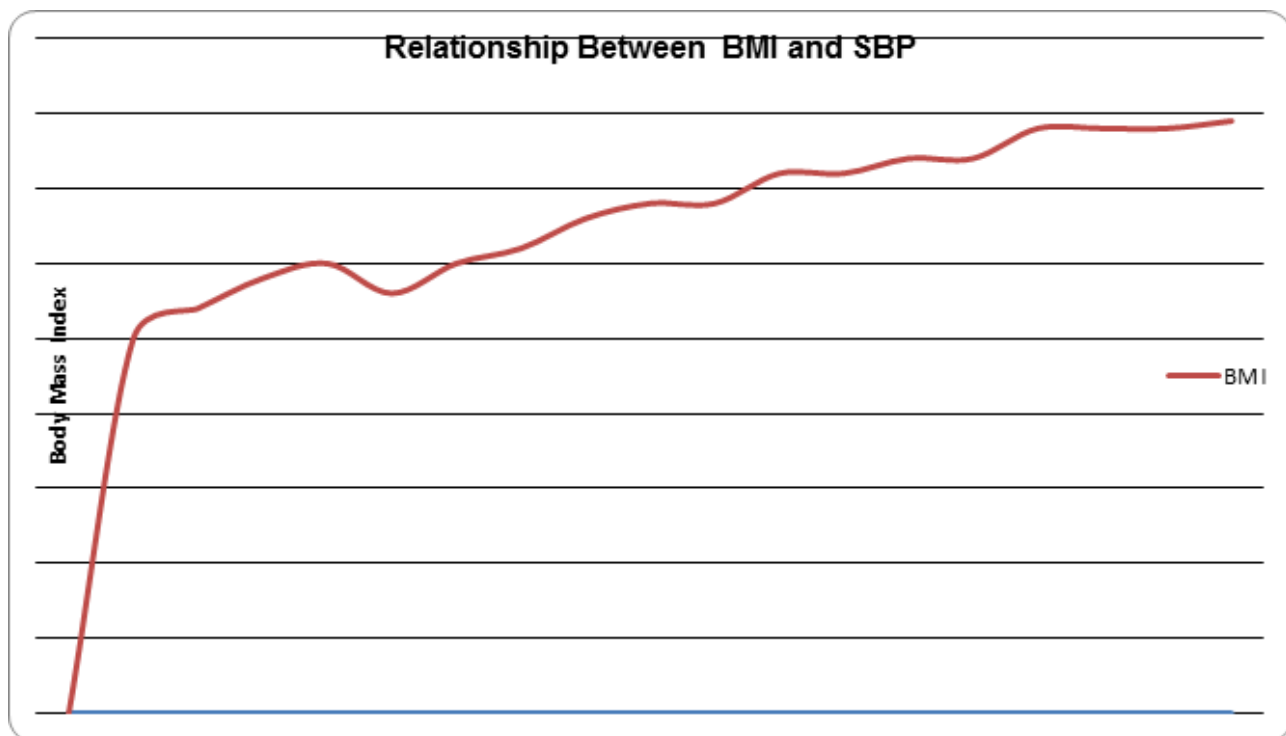
The overall prevalence of hypertension among the interstate commercial drivers in Jabi park, Abuja was 37 (9.0%). This included 16 (4.0%) new cases detected during the study and 21(5.0%) already diagnosed and were on treatment. Hypertension was more prevalent among the 36 to 65 year age group as shown in Table 2. Co-morbidity of diabetic mellitus and hypertension occurred among 15 (3.7%) of the respondents.

Distribution of risk factors among the hypertensive and non hypertensive respondents

The number of respondents that smoked were 86

Table 2. Age distribution of the respondents by status of blood pressure (N=398).

Age group (years)	Hypertension [n (%)]	No hypertension [n (%)]
16-25	0	34 (9.5)
26-35	0	131 (36.7)
36-45	11 (2.8)	121 (33.9)
46-55	13 (3.1)	74 (20.7)
56 -65	13 (3.1)	19 (5.3)
66+	0	2 (0.56)
Total	37 (9.0)	361 (91)

**Figure 1.** Relationship between Systolic Blood Pressure and Body Mass Index among the new cases during the study. ($r=0.8$).

(21.7%) of which 2 (2.3%) were hypertensive. There were 204 (51.3%) physically inactive respondents. Most of the respondents 322 (81.1%) ate more than three times per day. A total of 141 (35%) drank at least one bottle of alcohol per day and 5 (3.9%) of these respondents were hypertensives. Of the respondents who drank alcohol, 48 (34.3%) drank daily while 56 (40%) drank twice a week. Majority of alcohol users 104 (72.2%) reported taking 1 to 3 bottles of beer per day in the last 3 months. No respondents drank before driving but 109 (77.9%) reported being drunk in the past 30 days before the study.

Obesity was assessed using BMI and WHR. Eighty two (20.7%) of the respondents were underweight (WHR < 0.85) while 12 (3.0%) of the respondents were

underweight using BMI <18 kg/m². There were 137(35.8%) overweight respondents (using BMI 25 to 29.5 kg/m²), and 102 (25.7%) using a WHR 0.90 to <0.95. Seventy five (18.4%) of the respondents were obese using BMI ≥30 kg/m² while 99 (24.7%) were obese using WHR>0.95. Hypertension was found among 19.9% of those obese.

Thirty-nine (9.9%) of the respondents had hyperglycaemia and of this 51.0% had hypertension. The prevalence of hypercholesterolemia among the respondents was 129 (34.4%), hypertriglyceridemia 183 (46%), high density hyperlipoproteinemia 72(18%), and low density hyperlipoproteinemia 168 (42%). There was a linear correlation ($r=0.8$) between systolic blood pressure and body mass index as shown in Figure 1.

Risk factors associated with hypertension among respondents

Respondents who had a BMI of $>30 \text{ kg/m}^2$ were 11 times more likely to develop hypertension, (OR=11, 95%CI: 3.8-34.6) compared with those non-obese. Similarly, a driver with abdominal obesity measured by waist-to-hip ratio had 13 times the odds of developing hypertension (OR=13, 95%CI: 3.7 - 49.6) compared to non-obese drivers. Both obesity by BMI and abdominal obesity (WHR) were significantly associated with hypertension. A significant association was found between age and hypertension. Respondents aged ≥ 40 years were 3.6 times more likely to develop hypertension (OR= 3.6, 95%CI: 1.2-11.6) compared with those in younger age group. While respondents with a family history of hypertension were 4 times more likely to develop hypertension (OR=4.1, 95% CI: 1.97-8.08). The respondents with hypercholesterolemia had 4.5 times the odds of being hypertensive (OR=4.5, 95% CI: 1.51-13.20) compared to those with normal cholesterol values, while those with high density hyper lipoprotein had 18 times the odds of developing hypertension (OR=18.2, 95% CI: 8.6-43.0) compared with those with normal values. In addition, respondents with low density hyperproteinaemia had 2.8 times the odds of developing hypertension (OR=2.8, 95% CI: 1.4 – 58.0) (Table 3).

Predictors of hypertension among respondents

Logistic regression revealed that age was a predicting factor of hypertension among commercial drivers. Obese individuals with $\text{BMI} \geq 30 \text{ kg/m}^2$ (Adjusted Odds Ratio (AOR) 6.23; 95%CI: 1.88-20.71) were 6.2 times more likely to develop hypertension than respondents with $\text{BMI} < 30 \text{ kg/m}^2$. Individuals with abdominal obesity with Waist to Hip ratio of > 0.95 (AOR= 6.4; 95%CI: 1.54-27.0) were 6.4 times more likely to develop hypertension than respondents with $\text{WR} < 0.95$. Respondents who reported positive family history of hypertension (AOR = 1.7; 95%CI: 0.48-6.49) were 1.7 times more likely to develop hypertension than those with no family history. Respondents with hypercholesterolemia (AOR=4.0; 95%CI: 1.24-13.18) were 4 times more likely to develop hypertension than the respondents with normal cholesterol levels. A family history of hypertension, obesity and total cholesterolemia were predictors of hypertension among the commercial drivers in Abuja (Table 4).

DISCUSSION

The prevalence of hypertension among the respondents in this study was 9%. This is higher than the national prevalence for rural community in Nigeria (5 to 7%) but much less than the National Survey report for prevalence

of hypertension in the urban areas in Nigeria (17 to 20%) (WHO Technical Report Series, 2000). When compared with prevalence from studies carried out in different settings, the prevalence among these commercial drivers is less than that found in southwestern rural community with prevalence of 21% (Erhun et al., 2005).

If active search for hypertension is not instituted among this group of people and hypertension is not adequately controlled, this may lead to hypertensive encephalopathy which if occurs during driving could lead to mass mortality from resulting auto-crash. Therefore hypertension among this important category of people is of public health significance which requires urgent attention.

Limitations

The study was done within one motor park which may not be a true representative of all the motor parks or commercial drivers in FCT, therefore the findings cannot be generalized. Secondly, there were a few blood samples that were not enough to analyze the blood cholesterol levels and needed to be repeated but the respondent had travelled out of Abuja and could not be reached (due to the nature of the job) before writing up the report. This study relied on self-report, and is, therefore, subject to reporting bias.

Conclusions

The prevalence of hypertension and associated risk factors among commercial drivers in Jabi is high and of public health importance.

Conflict of Interests

The authors have not declared any conflict of interests.

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Table 3. Risk factors associated with hypertension among respondents.

Variable	Frequency (%)	OR	95%CI		P-value
			Lower	Upper	
Physical activity					
Yes	194 (49)	1.3	0.6	2.6	0.61
No (Ref)	204 (51)	1			
BMI categories					
BMI \geq 30 kg/m ²	66 (16.6)	11.4	3.8	34.6	0.002 [*]
BMI<30 kg/m ² (Ref)	332 (83.4)	1			
Overweight					
BMI 25-29.9	146 (36.8)	1.6	0.5	5.1	0.60
BMI \leq 25 (Ref)	186 (46.3)	1			
WHR Categories					
Central obesity					
WHR > 0.95	98 (24.7)	13.6	3.7	49.3	0.001 [*]
WHR < 0.95 (Ref)	300 (75.3)	1			
Overweight					
WHR 0.9- \leq 0.95	102 (25.7)	2.3	0.6	11.2	0.35
WHR <0.9 (Ref)	197 (49.7)	1			
Alcohol intake					
Yes	141 (35.0)	1.0	0.4	3.3	0.90
No (Ref)	257 (65.0)	1			
Smoking					
Yes	86 (21.7)	4.0	0.5	30.9	0.26
No (Ref)	311 (78.3)	1			
Age					
\geq 40 years	176 (44)	3.6	1.2	11.6	0.02 [*]
<40 years (Ref)	221 (56)	1			
Hyperglycemia					
Yes	39 (9.9)	1.0	0.2	3.2	0.9
No (Ref)	359 (90.1)	1			
Number of meals per day					
\leq 3x/day (Ref)	76 (18.9)	1			
>3x/day	322 (81.1)	1.5	0.4	5.3	0.8
Family history of hypertension					
Yes	74 (18.6)	13.7	6.0	33.1	0.001 [*]
No (Ref)	324 (81.3)	1			
Hypercholesterolemia					
Yes	129 (34.4)	4.1	1.5	13.2	0.001 [*]
No (Ref)	269 (64.5)	1			

Table 3. Cont'd.

Hyper triglyceridemia						
Yes	183 (46.0)	1.0	0.6	2.4	0.9	
No (Ref)	215 (54.0)	1				
High density hyper lipoproteinemia						
Yes	72 (18)	18.2	8.6	43.0	0.001*	
No (Ref)	326 (82)	1				
Low density hyper lipoproteinemia						
Yes	168 (42)	2.8	1.4	58.0	0.006*	
No (Ref)	230 (58)	1				

*Significant at 5% level.

Table 4. Logistic regression modeling risk factors significantly associated with hypertension.

Variable	Adjusted odds ratio	95% CI		Coefficient	SE	P-value
		Lower	Upper			
Age≥ 40 years	1.5631	0.4150	5.8874	0.4467	0.6766	0.5091
Age<40 years (Ref)	1	-				
Positive family history	1.6740	0.4823	6.1864	0.4998	0.6124	0.0101*
No family history (Ref)	1					
Obese WHR>0.95	6.4422	1.5371	26.9994	1.8629	0.7311	0.0108*
WHR <0.95 (Ref)	1					
TC Hyper	4.0433	1.2400	13.1837	1.3971	0.6030	0.0205*
Normal TC (Ref)	1					
HDHL	3.3416	0.5857	19.0653	1.2065	0.8885	0.1745
Normal HDL (Ref)	1					
LDHL	0.4918	0.1043	2.3201	-0.7096	0.7914	0.3699
Normal LDL (Ref)	1					
Obese BMI≥30 kg/m2	6.2313	1.8754	20.7046	1.8296	0.6127	0.0028*
BMI<30 kg/m2 (Ref)	1					

for related program by the division) which was adapted for this study.

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