

Public Knowledge of Chronic Kidney Disease in a Resource-Limited Setting: A Cross-Sectional Study.

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Abstract

Aim: Awareness of chronic kidney disease (CKD) includes general knowledge of CKD and its risk factors. The current study aimed at assessing the public knowledge of CKD by using a validated tool. **Methods:** A community-based cross-sectional study was conducted. The target population of this study was lay public, and health professionals were excluded from the study. Proportional numbers of study participants were included from each sub-city based on their total population size. The data was analyzed using SPSS version 21. Frequencies, table's percentage, mean and standard deviation were used to describe participants' responses: Independent T-test and one way ANOVA statics was used to identify factors associated with public knowledge of CKD. **Results:** A total of 350 individuals were approached, 301 of whom completed and returned the questionnaire, giving a response rate of 86%. In this study, the mean (S.D.) knowledge score of participants was 11.12 (± 4.21), with a minimum of 0 and a maximum of 22. Concerning the distribution of the CKD knowledge score, half of the respondents score 11 and less. One way ANOVA revealed that educational level had a significant effect on knowledge of CKD. Respondents who had an educational background of degree had relatively higher knowledge scores than the other category participants (P-value= 0.015). An independent t-test was also performed but failed to reveal any association between socio-demographic characteristics and knowledge score. **Conclusions:** The general knowledge level of the Ethiopian population about CKD and its risk factors is low. Currently, non-communicable disease such as diabetes and hypertension becomes public health concern and are one of the significant risk factors for CKD. As the study indicated, even these groups of populations were not adequately informed regarding their increased risk of developing CKD. **Keywords:** chronic kidney disease, public knowledge, Ethiopia

Public knowledge of chronic kidney disease in a resource-limited setting: a cross-sectional study.

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Conclusions : The general knowledge level of the Ethiopian population about CKD and its risk factors is low. Currently, non-communicable disease such as diabetes and hypertension becomes public health concern and are one of the significant risk factors for CKD. As the study indicated, even these groups of populations were not adequately informed regarding their increased risk of developing CKD.

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What is already known?

- Awareness about CKD includes general knowledge, risk factors, and consequences owing to the disease.
- Early identification and management of CKD can reduce undesired outcomes related to the disease. However, nearly all CKD conditions were not clinically familiar primarily because of the poor public awareness about the disease
- There is a consensus that CKD prevention is the best health policy alternative for decreasing the costs associated with a better health outcome of this disease, particularly in developing countries with limited healthcare resources

What does this article add?

- The general knowledge level of the Ethiopian population about CKD and its risk factors is low.
- Non-communicable disease such as Diabetes and hypertension becomes public concern those are one of the significant risk factors for CKD.
- The study indicated even these groups of populations are not adequately informed regarding their increased risk for developing CKD. Future public awareness programs should be more targeted toward patients with CKD risk factors and communities with low educational level.

Introduction

Health literacy has come to be used to refer to an individual's capacity to understand health information and catch up in the healthcare process. Low health literacy among the population is associated with deteriorated health outcomes (1). Awareness of Chronic Kidney Disease (CKD) includes general knowledge, risk factors, and consequences owing to CKD (2). CKD defined as an estimated or measured glomerular filtration rate

(GFR) < 60 mL/min/1.73m² that persists for [?]three months with or without evidence of kidney damage or evidence of kidney damage with or without decreased GFR (3).

Early identification and management of CKD can reduce undesired outcomes related to the disease. However, nearly all CKD conditions were not clinically familiar primarily because of the poor public awareness about the disease (4). Limited general knowledge of the particular disease is an obstacle to the successful implementation of prevention programs (5). In 676 patients with CKD, more than 1/3rd of patients claim to know little about their CKD diagnosis, and nearly half reported that they did not know of treatment alternatives if their kidneys failed (6). In Ethiopia, there is a shift from infectious disease into non-communicable chronic disease in the past few decades (7).

The causes of CKD differ worldwide. Poor glycemic control, uncontrolled hypertension, nephrotoxins drugs, and smoking are recognized as the leading risk factors of CKD (8,9). Between 1990 and 2010, the spread of CKD moved up to significant lists of causes of global death, from 29th to 18th (10). A large Chinese study found a 10.8% prevalence of CKD. Hence only 12.5% of them knew about their disease (11).

There is a consensus that CKD prevention is the best health policy alternative for decreasing the costs associated with a better health outcome of this disease, particularly in developing countries with limited healthcare resources (12). Therefore, creating awareness about CKD and its risk factors among the public is generating considerable interest in terms of strategies for CKD prevention. Whereas, limited knowledge about the disease and possible risk factors set to become a vital factor in prevention strategies with limited or poor effectiveness, causing financial burden in the health care system, poor clinical outcome including progressing to advanced stage of the disease.

Information about public knowledge of CKD is crucial to understand the information gap and planning several educational interventions. However, previous work in Ethiopia has only focused on aspects of CKD prevention and failed to address public knowledge. Therefore, this cross-sectional study was conducted to seek to answer the fallacy areas in the population by evaluating public awareness. The findings of this study will assist in identifying knowledge gaps, preparing educational sessions, facilitating screening programs among the society, and preventing the occurrence of CKD. Therefore, the current study aimed at assessing the public knowledge of CKD by using a validated tool.

Methods

Study design and setting

A community-based cross-sectional study was conducted in Addis Ababa, which is the capital of Ethiopia. The city is administratively divided into ten sub-cities. According to 2007 national population and housing census report, the city had an estimated population of 3,604,000 (1,703,000 males and 1,900,000 females) (CSA, 2013).

Participant recruitment

The target population of this study was lay public, and health professionals were excluded from the study. The proportional number of study participants were included from each sub-city based on their total population size. Convenient sampling was employed to collect the data from all ten sub-cities until we have the desired sample from each sub-city. Written and verbal consent was obtained from each study participants based on their educational status.

Study instrument

A paper-based self-administered and interviewer-administered questionnaire was used to collect data from study participants. The data collection tool was developed through an extensive review of the literature. The questionnaire was initially developed in English, was translated to Amharic language and back to English to ensure that the 88 final version gave the intended meaning. Amharic version of the questionnaire was used for collecting data. The survey instrument was further pretested on 25 Addis Ababa residents who were not included in the final analysis, and slight modifications were instituted in the definitive data collection

tool. The final questionnaire has six parts, section one assessed socio-demographic information of the study participants; section two aimed to explore participant's general knowledge regarding CKD; section three and four focused on examining respondents' acquaintance with essential kidney functions and joint laboratory investigations used to measure kidney health, respectively; section five included questions to investigate the respondent's knowledge of risk factors of CKD, whereas section six aimed to assess the sign and symptoms of advanced CKD. The survey questions on Kidney and CKD's knowledge were categorized into three responses (True, False, and I do not know).

Data collection

Two trained data collectors were enrolled in data collection. The principal investigators provided half-day training for data collector on the data collection instrument and ethics. The data collection was done from September to November 2018.

Statistical analysis

The data was analyzed using statistical package for social science (SPSS) version 21. The response of the study participants was rated as 1= True, 2= False and 3= I do not know when the correct answer for the particular question is right: it was rated as True = 1, False =0 and I do not know = 0. Otherwise, when the correct answer is False, it was coded as True = 0, False = 0 and I do not know = 0. Frequencies, table's percentage, mean, interquartile range (IQR) and standard deviation (S.D.) were used to describe the response of participants. Independent T-test and one way ANOVA statics were used to identify factors associated with public knowledge of CKD.

Results

A total of 350 individuals were approached, 301 of whom completed and returned the questionnaire, giving a response rate of 86%. The mean (S.D.) age of study participants was 33.03+-10.05 years, and it ranged from 18 years to 65 years. An almost equal number of male (48.2%) and female (51.8%) respondents represented the study. Nearly thirty percent of respondents completed secondary school (28.9%) and were unemployed (29.9%), respectively. Majority of the respondents were single (175, 58.1%).

Of the total 301 participants, forty (13.3%) of them had a familial history of CKD, and less than five per cent of respondents had a personal history of stroke (3.7%). Remarkably, Eighty per cent of the participants were free from any medical condition that requires medication at the time of the study. 10.6%, 7.6% and 7.0% of respondents have had hypertension, diabetes and heart attack, respectively. In this study, the majority of participants live in the house of five and above (54.5%) (See table 1).

In this study, the mean (S.D.) knowledge score of participants was 11.12 (+4.21) with a minimum score of 0 and a maximum of 22. Concerning the distribution of CKD knowledge score, half of the respondents score 11 and less. Majority of the participants are aware that kidney makes urine (72.8%) and clean blood (67.8%). More than half of the participant identified that Diabetes (57.8%) and hypertension (51.8%) are the risk factors for CKD. However, only one-fourth of the participants knew that being female has got nothing to do with increasing the risk of CKD (25.2%). A significant number of respondents knew that urine test help to determine kidney health (87.7%). Nearly sixty per cent of respondents recognized that certain medications could help in lowering the progression of CKD (57.5) (See table 2).

One-way ANOVA was employed to test significant association between socio-demographic characteristics and knowledge score. The analysis revealed that educational level had a significant effect on knowledge of CKD. Respondents who had an educational background of degree had relatively higher knowledge scores than the other category participants (*P-value* = 0.015). Independent t-test was also performed but failed to reveal any association between socio-demographic characteristics and knowledge score (See table 3).

Discussion

Public health literacy is an essential concept in modern society that determines the health behavior of individual's and community. It affects the level of health services utilization and improves the intended

outcome of health care services (14). The complex nature of chronic disease needs better health literacy from the public and individual patient. With better health literacy, it is possible to reduce the incidence of chronic disease and improve management of their complication efficiently. Knowledge toward the disease is of great importance in health literacy (15-16). This study is the first in Ethiopia to assess public knowledge of chronic disease. CKD is a significant health concern in Ethiopia even though the inadequacy in data of national figure hospital-based assessment revealed a higher magnitude of CKD (17). For combating this health problem, improving the health literacy of the society would be of great benefit. Therefore understanding the knowledge gap and determining the appropriate intervention is a prior issue.

Consequently, findings generated from this study would be a significant input for policymaker and program manager to look into appropriate intervention. In our study, we explored the public knowledge towards CKD using the tool adopted from previous study (5). The tool was pretested and discussed with experts on its strength to capture the necessary details.

The computed mean (S.D.) knowledge score was found to be 11.2 (+- 4.21), which is a substantial level of knowledge. It is comparable with the findings reported from Australia and Tanzania, which was 10.34 (+- 5.0) and 3.85 (+- 4.66), respectively (5, 13). This high score of knowledge is mainly associated with participant characteristics. We recruited the participant from the capital city of the country, unlike the previous study (13) and more than half of them had a college diploma and above. It was found from the current study established that educational level had a significant effect on knowledge of CKD with *P-value* of 0.015. Therefore the higher score of the knowledge would be associated with a large number of educated participant and the study site we selected. This finding would not be representative of the country; hence the literacy rate of the Ethiopian population is below 50 per cent, and only 20.4 per cent of the population is the urban population (18). The study included a significant number of rural household participants claimed lower knowledge score in comparison to our study (13).

Regarding general knowledge of study participants on chronic kidney disease, 83.7 % of the study participants knew that a person could lead a healthy life with one healthy kidney; this was slightly lower in comparison to Hong Cong study, in that study most (84.7%) of the participant were aware of the kidney's function (11). However, the finding of the current study is also promising since organ shortage is a global crisis and the public knowledge and awareness is a crucial element for promoting the living organ donation practice (19). As a developing country, the level of awareness claimed in this study is substantial. A lower number of a study respondent (22.6 %) believes that herbal supplements can be useful in treating CKD however 2/3rd of the participant from Tanzania study claimed that they were likely to use traditional medicines for the treatment of kidney disease and also around 14 % 177 of use self-treatment with home remedies(13). A study from Nigeria revealed that 47.8 % of respondents have faith in local herbal concoctions and spiritual means to cure CKD (10), this may be associated with the belief in herbal medicine in the urban area.

In the present study, almost half (57.5 %) of the study participants knew that certain medications could help to slow down the worsening of CKD, which was lower in comparison to Hong Cong study (80 %). In previously, mentioned study half of the study group had a risk factor for CKD such as diabetes and hypertension (11) that may increase their awareness towards risk factor for CKD. With current evidence expanding health education to prevent CKD is indispensable. Since there are several treatment options which able to render the progression of CKD by preventing the advance in risk factor (20), most participants knew that the kidney makes urine and kidney clean blood, but around 21 and 34 per cent of the participants identified that the kidney helps to maintain blood pressure and keep bones healthy respectively. Likewise, in Hong Cong study, nearly half of the study participants did not know the role of the kidney in maintaining blood pressure (11). Therefore health education focusing on chronic disease prevention and management is critical. There is an increase in the prevalence of the chronic disease in Ethiopia, particularly in urban setups; therefore, due focus from policymaker and health care strategist is expected (21).

The majority of the study respondents knew that hypertension (51.8 %) and Diabetes (57.8 %) are the risk factors for the development of CKD. This finding is similar to several studies elsewhere (10-12). This finding is promising since the public has a good awareness of the risk factor of the disease; the possibility of

prevention would be higher. About signs and symptoms of an advanced stage of CKD, 68.8 % of recognized water retention is one of the advanced stage symptoms, nausea and vomiting (39.5 %), loss of appetite (56.6 %) and increased fatigue (75.7%). This finding depicted participants had good knowledge of alarming signs and symptoms of CKD in comparison to previously reported results (5, 10). This would help implement prevention strategies and management of a communicable disease.

Similar to other studies, public knowledge CKD significantly associated with the level of education. Several other studies depicted that the level of education is significantly associated with knowledge related to CKD (5, 10-11). Since health literacy is highly associated with personal determinants like knowledge and competence, this variation is the expected (14). In addition to health literacy, the general literacy of society is essential for improving the overall wellbeing of society. This study assessed the public knowledge of CKD for the first time in Ethiopian, and it produced useful findings which serve as an input for health education programs at the community level, in health facilities and media sector. Furthermore, the findings serve as an input for in-service and pre-service training of health professionals in Ethiopia. As a limitation, we recruited participants only from the capital city of the country and further studies focusing on the rural base of the country will be needed.

Conclusion

The general knowledge level of the Ethiopian population about CKD and its risk factors is low. Currently, non-communicable disease such as Diabetes and hypertension becomes public concern those are one of the significant risk factors for CKD. As the study indicated even these groups of populations are not adequately informed regarding their increased risk for developing CKD. Future public awareness programs should be more targeted toward patients with CKD risk factors and communities with low educational level.

Abbreviations

CKD: chronic kidney disease; GFR: Glomerular Filtration Rate; IQR: Interquartile range; SD: standard deviation; SPSS: statistical package for social science.

Ethical approval and consent to participation

The ethics review committee approved the study of the school of pharmacy, Addis Ababa University. Before initiation of the study, written informed consent was obtained from all of the participants.

Consent for publication

Not applicable.

Availability of data and material

The data sets analyzed in the current study are available from the corresponding author on request.

Conflict of interest

The authors declared no conflicts of interest.

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No financial support was gained to conduct the study.

Author's contribution

ABY designed the work. ABY and KTH participated in proposal writing and data collection. KTH, HGT and YBB have participated in data analysis and interpretation. ABY, KTH, HGT and YBB were responsible for questioner design and manuscript wrote up. All authors read and approve the final manuscript.

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Reference

1. Gray NA, Kapojos JJ, Burke MT, Sammartino C, Clark CJ. Patient kidney disease knowledge remains inadequate with standard nephrology outpatient care. *Clin Kidney J.* 2016;9(1):113–8.
2. Plantinga LC, Tuot DS, Powe NR. Awareness of Chronic Kidney Disease Among Patients and Providers. *Adv Chronic Kidney Dis* [Internet]. Elsevier Ltd; 2010;17(3):225–36. Available from: <http://dx.doi.org/10.1053/j.ackd.2010.03.002>
3. Mathew T. Chronic Kidney Disease (CKD) Management in 260 General Practice. In: *Chronic Kidney Disease (CKD) Management in General Practice.* 2015. p. 1–56.
4. Goro KK, Wolide AD, Dibaba FK, Fufa FG, Garedow AW, Tufa B.E., et al. Patient Awareness, Prevalence, and Risk Factors of Chronic Kidney Disease among Diabetes Mellitus and Hypertensive Patients at Jimma University Medical Center, Ethiopia. *Biomed Res Int.* 2019;2019:1–8.
5. Gheewala PA, Peterson GM, Zaidi STR, Jose MD, Castelino RL. Public knowledge of chronic kidney disease evaluated using a validated questionnaire. *BMC Public Health.* BMC Public Health; 2018;18(371):1–12.
6. Wright JA, Wallston KA, Easy TA, Alp T, Cavanaugh KL. Development and Results of a Kidney Disease Knowledge Survey Given to Patients With CKD. *NIH Public Access.* 2012;57(3):387–95.
7. Begashaw B, Tessema F, Gesesew HA. Health Care Seeking Behavior in Southwest Ethiopia. *PLOS ONE.* 2016;11(9):1–13.
8. Webster AC, Nagler E V, Morton RL, Masson P. Chronic kidney disease. In: *Chronic kidney disease* [Internet]. Elsevier Ltd; 2017. p. 1238–52. Available from: [http://dx.doi.org/10.1016/S0140-6736\(16\)32064-5](http://dx.doi.org/10.1016/S0140-6736(16)32064-5)
9. White SL, Cass A, Shaw J, Heart B. Limited knowledge of kidney disease in a survey of AusDiab study participants. *MJA.* 2008;188:204–8.
10. Oluyombo R, Ayodele O, Akinwusi P, Okunola O, Gbadegesin B, Soje M, et al. awareness, knowledge and perception of chronic kidney disease in a rural community of southwest Nigeria. *Niger J Clin Pract.* 2016;19(2):161–9.
11. Chow KM, Szeto CC, Kwan BCH, Leung CB, Li PKT. Public lacks knowledge on chronic kidney disease. *Hong Kong Med J.* 2014;20(2):139–44.
12. Roomizadeh P, Taheri D, Abedini A, Mortazavi M, Larry M, Mehdikhani B. Limited knowledge of chronic kidney disease and its main risk factors among Iranian 284 community. *Int J Heal Policy Manag.* 2014;2(4):161–6.
13. Stanifer JW, Turner EL, Egger JR, Thielman N, Karia F, Maro V, et al. Knowledge, Attitudes, and Practices Associated with Chronic Kidney Disease in Northern Tanzania. *PLoS One.* 2016;11(6):1–14.
14. Sorensen K, Van den Broucke S, Fullam J, Doyle G, Pelikan J, Slonska Z, Brand H. Health literacy and public health: a systematic review and integration of definitions and models. *BMC public health.* 2012

Dec;12(1):80.

15. Poureslami I, Nimmon L, Rootman I, Fitzgerald MJ. Health literacy and chronic disease management: drawing from expert knowledge to set an agenda. *Health Promotion International*. 2016 Feb 12; 32(4):743-54.
16. Gazmararian, J.A., Williams, M.V., Peel, J. and Baker, D.W., 2003. Health literacy and knowledge of chronic disease. *Patient education and counseling*, 51(3), pp.267-275.
17. Kore, C., Tadesse, A., Teshome, B., Daniel, K. and Kassa, A., 2018. The magnitude of chronic kidney disease and its risk factors at Zewditu Memorial Hospital, Addis Ababa, Ethiopia. *J Nephrol Ther*, 8(3), p.313.
18. Indexmundi, 2018. Ethiopia Demographics Profile. <https://www.indexmundi.com/ethiopia/demographics-profile.html> (accessed 11.26.19).
19. Abouna GM. Organ shortage crisis: problems and possible solutions. In *Transplantation proceedings* 2008 Jan 1 (Vol. 40, No. 1, pp. 34-38). Elsevier.
20. Jaber BL, Madias NE. Progression of chronic kidney disease: can it be prevented or arrested? *The American journal of medicine*. 2005 Dec 1; 118(12):1323-30.
21. Shiferaw F, Letebo M, Misganaw A, Feleke Y, Gelibo T, Getachew T, Defar A, Assefa A, Bekele A, Amenu K, Teklie H. Non-communicable Diseases in Ethiopia: Disease burden, gaps in health care delivery and strategic directions. *Ethiopian Journal of Health Development*. 2018;32(3).

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