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論文内容の概要表

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論文内容の要旨

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Chapter 1 : The purpose of this chapter was to introduce the adolescence obesity situation in urban Harare, Zimbabwe. In Zimbabwe, obesity is both an emerging health problem and a grey area, particularly among adolescents. Zimbabwe has both established and upcoming health promotion programs which do not include adolescence nutrition. These unique programs are designed to combat chronic malnutrition (stunting), for young children, expectant mothers, the elderly and immunocompromised individuals. However, despite the evidence of the double burden of malnutrition and the rise of obesity and non-communicable diseases, which are mainly caused by nutrition transition, these health promotion programs are still biased towards undernutrition. The aims of the study were to gather existing evidence on the determinants of obesity and expose research gaps on adolescence nutrition studies. Furthermore, cardiometabolic health risk (CMR), obesity awareness and factors associated with high CMR risk and low obesity awareness among adolescents were assessed. This led to suggestions for future obesity and CMR prevention and nutrition education strategies among adolescents. This study contributes to the future health promotion programs and policies in Zimbabwe by establishing the base to address obesity issues among urban adolescents, and it can be postulated that these findings may also be useful for other low-income countries.

Chapter 2 : The purpose of this chapter was to gather existing studies to provide evidence of the emerging obesity problem in Zimbabwe. A scoping review guided by the Bronfenbrenner

socio-ecological ecological model (SEM) was used to categorize the determinants of adolescents' obesity in Zimbabwe into individual, social, environmental, and economic categories. The five-stage Arksey and O'Malley review methodology was used to formulate research questions, systematically search, and screen for relevant studies done between 2010 and 2020. The results showed that the at individual level risk of obesity was higher among older adolescents (16-19 years), particularly girls. Interestingly, the same girls had higher nutrition knowledge compared to boys. Conversely, both boys and girls lacked knowledge on diet related non-communicable diseases (NCDs). Fast food consumption, unhealthy snacking, and low dietary diversity increased the odds for obesity. At the societal level, socio-cultural beliefs (plump bodies are a sign of beauty and wealth), high family income, having formally employed parents increased the odds of obesity. Interestingly, the review showed that high income families do not buy healthy food and low-income families do not afford healthy foods like fruits and vegetables for enhanced dietary diversity. At the environmental level, obesogenic school environments with high access to ultra-processed foods and residing in urban environments increased the odds of obesity. Economic instability appears to drive the availability and consumption of cheap unhealthy foods, particularly within the school environments.

Chapter 3: The purpose of this chapter was to assess the prevalence of obesity, CMR, and associated determinants among in-school adolescents in Harare, Zimbabwe. The participants were 320 adolescents aged 14–19 years recruited from 10 schools in Harare using a stratified random sampling technique. Blood measures for blood pressure (BP), glucose (FG), and total cholesterol (TC) were assessed using standard methods and (BMI), and waist-to-hip ratio (WHR), waist-to-height ratio (WtHR) were calculated. Pearson's Chi-Squared and binary logistic regression were used to test for associations and explored factors associated with CMR (p< 0.05). The median and IQR range age for the participants was 16 (14;19) years. The prevalence of obesity was (17.1%) and CMR was (24.7%), both of which were higher among girls compared to boys. CMR was significantly associated with living in high economic status (HES) neighbourhoods OR=3.09(1.29-7.38), p=0.011], inadequate nutrition knowledge score [OR=1.38(1.96-7.77), p< 0.001], inadequate physical activity [OR=2.28(1.25-4.15), p= 0.007]; and increased BMI [OR=1.18(1.10-1.27), p< 0.001]. The prevalence of obesity and high CMR appears to be higher among girls compared to boys particularly from affluent neighborhoods. This gender disparity could be due to socio-cultural beliefs which may hinder the translation of nutrition knowledge to practice.

Chapter 4: The purpose of this chapter was to assess obesity awareness and related factors among adolescents. A cross-sectional survey guided by the health belief model (HBM) was performed using an interviewer-administered questionnaire. The participants were 423 adolescents aged 14–19 years recruited from 10 schools in Harare using a stratified random sampling technique. The results showed that the median ± IQR age of the participants was 16 (14–18) years, and overweight and obesity affected 15.8% of the participants with higher proportions among girls (73.1%, p= 0.002). Low obesity awareness was observed in 27.1% of adolescents with a higher proportion among girls (67.0%, p= 0.001), 14–16-year-olds (51.3%, p= 0.317), and obese adolescents (56.7%, p= 0.001). Regarding

obesity perceptions, only 13% of the adolescents reported that obesity was an extremely serious health issue, whereas 28.4% stated that obesity is a moderately serious problem. Additionally, they stated that the health insurance companies (48.2%), food industries (44.9%), are responsible for solving obesity problems and only 37.4% indicated that individuals are responsible. "People don't know how to control their weight (58.2%) and people don't have enough information about what's in their food (61.7%)" were selected as the major causes of obesity. The adolescents strongly favored more physical activity in schools (62.2%) compared to fast-food shops showing calorie information on the menu (29.8%) and limiting the types or amounts of food and drink people can buy (15.6%) as hypothetical solutions to overweight/obesity. Significant factors associated with low obesity awareness were household heads lacking formal education [OR = 9.41(2.20-40.36), p= 0.003] and inadequate (poor) food habits [OR = 2.58(1.33-5.01), p= 0.005]. The survey showed that although adolescents had different obesity awareness levels, girls were mostly affected. The adolescents had diverse perceptions towards obesity causes, and a range of potential solutions.

Chapter 5: The purpose of this chapter was to suggest obesity awareness and intervention measures based on the scoping review and survey results. Social behavior change communication (SBCC) is the strategic use of communication approaches to promote changes in knowledge, attitudes, norms, beliefs, and behaviors. It combines the findings from the SEM and HBM to provide socio-ecological solutions to obesity and CMR by influencing obesogenic beliefs practices and eating pattens and there is robust monitoring and evaluation to track changes in obesity and CMR awareness levels, and adoption of healthy behaviors to ensure sustainable behavior change. SBCC program has 10 functional steps, and this study already solved the first three steps. There is need for further research work to solve the remaining 7 stages to successfully launch the SBCC for obesity awareness and prevention among adolescents.

Chapter 6: The purpose of this chapter was to provide an overall summary of the whole study and to give recommendations for future studies, nutrition education and obesity intervention programs. The overall study confirmed that obesity studies are limited in Zimbabwe despite its rising prevalence and girls have a higher obesity and CMR risk, and lower obesity awareness than boys. Therefore, school based, family-oriented obesity themed SBCC programs are needed to raise obesity and CMR awareness, improve eating habits, and influence negative socio-cultural perceptions which hinder the translation of nutrition knowledge to practice. This program should teach adolescents that it is their responsibility to protect their own health by making healthy food choices like increasing fruit and vegetable intake etc. Adopting compulsory nutrition education as part of the school's curriculum where students learn about Zimbabwean dietary guidelines and diet related NCDs may help raise obesity awareness and improve dietary diversity. Food demonstrations at family level to improve knowledge of healthy food shopping and preparation would be a unique initiative in Zimbabwe. Nutrition education targeting both high-income and low-income parents can have cascading benefits in raising obesity awareness and influencing negative socio-cultural beliefs. Additionally, nutrition education programs for girls on the topics of eating habits and body image are recommended. Body

image studies within the Zimbabwean context are needed to help influence unhealthy beliefs and socio-cultural perceptions which lead to weight gain. Finally, considering that most of the evidence reviewed were subnational studies, there is a need for national adolescent nutrition surveys which address gender discrepancies in BMI.

論文審査結果の要旨

本研究は、申請者の母国であるジンバブエにおいて、思春期の子供たちにおける肥満および肥満に関連する健康障害と彼らの食習慣、栄養の知識、肥満に関する認識との関連性を明らかにすることを目的に行われた。

第1章：本研究の背景として、ジンバブエにおける思春期の肥満問題の現状を述べた。ジンバブエでは、肥満は新たな健康問題であり、肥満に関する研究が少ない。国家施策としての健康増進プログラムは、慢性的な栄養不良対策が主であり、肥満、特に思春期における肥満は、心代謝系リスクの要因として意識されていない現状を述べた。

第2章：ジンバブエで顕在化しつつある肥満問題の根拠となる既存研究を収集した。ジンバブエの思春期の子どもたちの肥満の決定要因を個人、社会、環境、経済のカテゴリーに分類するために、Bronfenbrenner の社会生態学的モデルを用いたスコーピングレビューを行った。結果、個人レベルでの肥満リスクは、年長の子ども（16〜19 歳）、特に女子で高いことが示された。社会レベルでは、「ふくよかな体は美しさと富の証である」といった社会文化的信念、高所得、正規雇用の親を持つことが肥満のオッズ比を増加させた。高所得家庭は健康的な食品を購入せず、低所得家庭は食生活の多様性を高めるための果物や野菜のような健康的な食品を購入する余裕がないことが示された。

第3章：ジンバブエの首都ハラレの学校に通う思春期の子どもにおける肥満率、心代謝系リスク、およびそれらの関連要因を検討した。対象者はハラレにある 10 校の学校から層別無作為抽出法により集められた 14〜19 歳の 320 人とした。肥満率は 17.1%、心代謝系リスクは 24.7% であり、いずれも男子に比べて女子で高かった。心代謝系リスクは、高経済地域に住むこと、栄養知識の不足、身体活動の不足、および BMI 増加と有意な関連がみられた。肥満と高心代謝系リスクは、男子に比べて女子で高く、特に裕福な地域にみられた。このような男女間の格差は、栄養に関する知識の実践への移行を妨げる社会文化的信念に起因している可能性があると述べている。

第4章：思春期の子どもたちの肥満に対する意識とその関連要因を明らかにすることを目的とした。健康信念モデルに基づく横断的調査を、調査者による面談方式で質問紙を用いて実施した。参加者は、ハラレの 10 校から層化無作為抽出法で集められた 14-19 歳の思春期の子ども 423 人であった。過体重と肥満は参加者の 15.8% を占め、女子で割合が高かった。肥満が健康障害の要因であるとの認識が低い（低肥満意識）のは 27.1% の回答者に見られ、女子、14-16 歳、肥満者で高かった。肥満の主な原因として、「人々は体重をコントロールする方法を知らない」、「人々は食べ物に何が含まれているかについて十分な情報を持っていない」が選択された。また、肥満の解決策として、ファストフード店でのカロリー表示、飲食物の種類や量の制限、学校での身体活動の強化を選択する者が多かった。低肥満意識に有意な関連する要因は、公教育を受けていない世帯主と不十分な（貧しい）食習慣であった。調査の結果、子どもたちの肥満に対する意識レベルはさまざまであり、多くの女子が影響を受けていた。本調査より、思春期の子どもたちは様々な肥満意識レベルを有しており、解決策の候補も多様であることが示された。

第5章：本研究結果に基づき、肥満に対する意識改善に関わる方法を提案した。社会的行動変容コミュニケーションは、社会生態学的モデルと健康信念モデルから得られた知見を組み合わせ、肥満と心代謝系リスクの原因となる信念の実践や食事パターンに影響を与えることで、社会生態学的な肥満の解決策を提供する。持続的な行動変容を促すための、肥満と心代謝系リスクに対する意識レベルの変化や健康行動の採用を追跡するモニタリングと評価を含む社会的行動変容コミュニケーションプログラムには 10 段階の機能的ステップがあり、本研究では最初の 3 ステップについて新たな知見を得た。この社会的行動変容コミュニケーションを成功させるためには、残りの 7 つの段階を解決するためのさらなる研究の追加が必要であると述べている。

第6章：研究全体の総括として、ジンバブエでは思春期の子供における肥満率が上昇しており、その対策として、学校を基盤とし、家庭を巻き込んだ肥満をテーマとした社会的行動変容コミュニケーションプログラムの策定、遂行が必要であり、そのなかで心代謝系リスクとしての肥満に対する意識を高め、食習慣を改善し、肥満克服に否定的な社会文化的認識の是正を図ることが必要である、と結論した。

以上、本論文はジンバブエにおける思春期の肥満という健康障害に関連する課題の現状、その克服に向けた対策の提案がなされ、本課題に関連した多くの有益な新知見を見出しており、臨床栄養学分野に一定の貢献を成した。よって本審査委員会は本論文が博士（生活科学）の授与に値するものと認めた。