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## RESEARCH ARTICLE

# ZÖRAC: MOBILE APPS FOR THE INTEGRAL MANAGEMENT OF OVERWEIGHT AND OBESITY IN MEXICAN CHILDREN

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**ABSTRACT**

Mexico ranks first in the world in Childhood Overweight and Obesity [OySP], in this context multiple proposals have emerged to combat OySP, from invasive clinical models to food policies such as food labels and calorie reduction in food, even so The OySP problem is on the rise. Objective: To build a technological application of the type App –Tics- Zörac in health that offers through digital interconnection, diagnosis with dietary guidance as well as promotion of healthy lifestyles and physical activity an integral management of obesity and overweight in children from Mexico. Method: Design and elaboration of Zörac App –Tics-, the following points were considered within the digital platform to be built: 1) Development of a child-friendly software through a Zörac App –Tics- concept, 2) Originate in a mediated way a food and physical activity orientation, 3) Creation of a children's menu space, 4) Statistics, prior settlement and informed consent, the page was presented to a group of children in a virtual way. Results: It is worth mentioning that this page was piloted in a group of 300 children between 8 and 12 years old, of which 69% presented OySP when entering the page, 24% normal weight and 7% malnutrition and, in a Over a period of 4 months, 6000 visits were registered by registered users, the most visited portals, Children's Menu [40%], I have Obesity [40%], I want to fight obesity [15%] and Knowing the enemy [5%], At the end of the four-month cross-section, we found 77% OySP, 17% normal weight and 6% malnutrition, this in registered users. Conclusions: This shows that the trend continues to rise, this could have been caused by the COVID 19 pandemic, which confined all citizens to isolation and little physical activity, and it is also shown that Mexico continues with two dichotomous aspects, OySP and malnutrition, this Zörac App –Tics page is a technological tool that can be very useful to monitor and combat these global pandemics. In Mexico, innovative programs that help to counteract this pathology must be supported.



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## INTRODUCTION

**OBESE MEXICO: to understand the complexity of the situation.** In Mexico, obesity and overweight (OySP) have become a social epidemic of uncontrollable magnitude. 75.2% of adults and 39% of children and adolescents have OySP, which together represent 73.6 million people (ENSANUT, 2018; ENSANUT, 2012), this represents more than half of Mexicans have this condition, which represents that 2 out of 3 children or adolescents are overweight or obese, and 8 out of 10 adults suffer from the same problem (ENSANUT, 2018; ENSANUT, 2016; ENSANUT, 2012), the consequences for the country of this OySP, is that they end for affecting life expectancy, the labor force, the economy and public spending on health, which leads to rethinking this problem from transdisciplinary approaches. OySP, are the result of a complex and multi-causal origin, where the nutritional transition is the result of processes such as: urbanization and labor flexibility, modification of family dynamics, technological changes in food production and processing, social reproduction of frameworks of significance, the media, globalization and hypermodernity, economic class poverty, food insecurity (IA), cities not compatible with healthy life styles and loss of cultural patterns (Casas, 2014; Poy, 2015; Ortiz, 2012). So the panorama of OySP is a framework full of common factors that establish a position of complexity, where reducing a single factor would exponentially multiply more factors to this pathology, that is why OySP should be looked at from a critical and alimentary epidemiology, where biological,

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socioeconomic, political and cultural causes make up webs of meanings with entropic social reproduction in the collective, where the only way out of this irremediable cascade of perdition is the formation of a conscience - *from the general , particular and singular*-, where the decision making of healthy lifestyles allows processes of determination of food consumption, which would reproduce healthy eating behaviors at all levels of the groups (Casas, 2014; Páez, 2018). The complexity of this situation in OySP has originated different alternatives for combat in Mexico, and none have resulted, from political strategies in health "*to prohibit the direct sale of junk food to minors*" (Garduño, 2020), through initiatives in education "*physical activation and healthy eating*" (Secretary of Public Education, 2010), interventions of the type "*bariatric surgery*" -procedure that consists of the anatomical modification of the digestive system to reduce and restrict food absorption- (Maggaard, 2013), "*Pharmacological treatments*" -sibitramine, mazindol, orlistat, biguanides, thiazolidinediones, aldactone, fenfluramine and dexfenfluramine- (NOM, 1988; WHO, 2012), as well as "*frontal labeling on its products and non-alcoholic beverages that informs the consumer of its content sodium, sugars and saturated fats* " (Méndez, 2019), in addition, international and national Congresses, Symposium and Seminars have been held where probl ematizes from the academy, research and political actors. In this way we can affirm that each and every one of these initiatives is disjointed and their indicators do not allow monitoring the real impact of each of these proposals, with which programs and strategies to combat OySP will not eradicate the problem, it is more sharpen.

In addition to the above, we find in 2020 a catastrophic panorama of COVID 19 which, associated with OySP, patients show a high risk of serious complications (Dietz, 2020; Finer, 2020; Chen, 2020), which in our context The current situation has led us to a catastrophic situation in this pandemic, reaching 128,000 deaths (cohort January 6, 2020), the Mexican Health System continues to be ineffective, since in most cases there is recurrence of OySP due to the fact that A compromise between parties is required - *general, particular and singular* - where the socio-economic-psychological-political, among other elements, influence the change of healthy lifestyles, which are never contemplated.

**ALTERNATIVES MOBILE APPS IN OYSP:** Currently, mobile applications can be marked as millions in the global market, but only a few are used to counteract global problems around health (WHO, 2020), since their maintenance, updating of patents and spaces on the internet, as well as its contents must be updated continuously, so without a budget or long-term financing, many of the applications take turns to fail and disappear from the internet. In relation to the OySP and mobile applications, more than 305 have been detected at an international level - search category: obesity, overweight, treatment and monitoring), but of that market only seven were used to monitor weight, physical activity and provide diets or nutritional counseling for free, non-profit (Gómez, 2020; Rashid, 2020), no mobile application was found for the simultaneous management of overweight / obesity, so an area of opportunity framed in Revolution 4.0 is to develop applications technological benefits for the collective. Therefore, the objective of this research was to build a technological application of the type App –Tics- Zörac in health that offers, through digital interconnection, diagnosis with dietary orientation as well as promotion of healthy lifestyles and physical activity management comprehensive to obesity and overweight in children.

## METHODOLOGY

**The design and development of Zörac App –Tics- consider the following points within the digital platform to be built:**

Development of a child-friendly software through a Zörac App –Tics- concept, which will offer two diagnoses: one confirmed diagnosis by Body Mass Index (BMI) and the other, through child body perception silhouettes: this technological development is carried out by personnel in computer systems directed by the project leader. These two diagnoses provide a real situation of the consultant's OySP which converts the information into an initial diagnosis through the BMI, in a friendly way, and gives us the opportunity to have continuity of follow-up through the BMI. Emphasis is also placed on a second diagnosis, made through the perception of the silhouette, since due to the context of living in a world with OySP, the obese silhouette is often normalized and a false figure or an idealized figure is created, In a social context plagued by OySP, in this way there are two initial diagnoses, which also give the opportunity to give continuous follow-up.

Mediate originate a food and physical activity orientation: this will be developed by Nutrition Graduates with a specialty in Sports, Psychologists, Health Promoters and Health Educators. Nutrition guidance will be given according to their age and basic diagnosis through the child-friendly software Zörac App –Tics, which will have more than 400 suggested diets attached to the Mexican context [attached to the intake of proteins, carbohydrates, lipids , minerals and vitamins, in children] and also, for the development of the software, the real accessibility of a family of low / middle class [which receives 1 to 2 US dollars a day] and likewise, a stands of foods geographically delimited to the area as well as dietary transition foods accepted by the population with high nutritional value, for which the dietary guidelines are attached and regionalized to this Mexican population, contemplating the rescue and healthy food continuity. The Zörac App –Tics software also recommends an exercise routine for physical activation, which are according to their chronological age, these can be done at home or in available spaces, this friendly Software is part of the Industrial 4.0 project and development.

Creation of a children's menu space, developed by Nutrition Graduates with a specialty in Sports, Psychologists, Health Promoters and Health Educators: taking into consideration the sociodemographic characteristics of belonging, this will be suggested for each week in which the children They will be able to start in the preparation of foods low in sugars but high in fibers and nutrients, this will be done by Nutritionists with experience in cooking, community and sustainability, supervised by Psychologists, Health Promoters and Health Educators, who will disseminate and guide schoolchildren via App.

Statistics, the page followed up through the granting of a unique user number, developed by Personal of System: this in order to monitor the number of visits to the portal, diagnoses, allowances granted and user monitoring, as well how to know which schools participate, shift and geographical area. The sample was applied with prior settlement and informed consent of students from public and private schools in the

State of Mexico-Oriente –Chalco, Valle de Chalco, Amecameca, Atlautla- at the primary level from 6 to 12 years of age, only working in a with students due to the restrictions of the Covid 19 Pandemic. The final product was the Zörac mobile application page [Scheme I], which was integrated with: 4 categories or functional banners, Children's Menu, I have Obesity, I want to fight obesity and Knowing the enemy, the page is at the link: https://zorac.com.mx/

Zörac mobile. https://zorac.com.mx/


Own source

## RESULTS AND DISCUSSION

It is worth mentioning that this page was piloted in an initial group of 800 children of which in a period of 4 months only a final sample of 300 children between 8 to 12 years was obtained, a final survey was carried out to know the reasons for not giving continuity to the activities on the platform, the following reasons were found from greater to lesser causality: abandonment conditioned by the COVID 19 pandemic - parents or relatives of direct or indirect affiliation who had a disease related to the pandemic-, not having electronic devices - you do not have your own device at home, it is shared with other family members and it is outdated for mobile applications - and there is no home or community internet, this shows that working from home online, It is complicated by not having the technological resources, this was an impediment to give continuity to a larger scale of our project.

Of the 300 children between 8 and 12 years old, 75% female and 25% male, of which 69% presented OySP, 24% normal weight and 7% malnutrition, this is contrasted with the latest survey in Mexico, which is the Ensanut Medio Camino (2016 and 2018), which reports 33.2% and 35.4% of school age, this data is official data which, when contrasted with what was detected by Móvil Zörac, shows that the reality of school groups goes much further than official statistics by detecting twice the prevalence of OySP, a fact that we must explore in schools where this pathology is rooted and where it can be fought, since they are concentrated in the same moment 5 days a week, either face-to-face or virtual, we can impact with educational models aimed at changing eating habits. In a period of 4 months, 6000 visits were registered by registered users, this is equivalent to 20 visits per period of the 300 children, the most visited portals in Mobile Zörac were *Children's Menu* [40%], *I have Obesity* [40%] , *I want to fight obesity* [15%] and *Knowing the enemy* [5%], at the end of the 4-month cross section, we found 77% of OySP, 17% normal weight and 6% malnutrition this in registered users, Here we observe an 8% increase in OySP, this may be a reflection of the confinement caused by the restrictions of social coexistence requested by the Ministry of Public Health, staying at home and suspension of school classes, with the limitation of physical activity and increase In the consumption of hypercaloric foods, I condition COVID kilos, this will make rethink the strategy of use of the Zörac Mobile, to focus on areas of restricted physical activity and increase physical activation classes in schools, in addition to motivating food n sports after physical activity. When analyzing the data in relation to normal weight and malnutrition, Mexico maintains a dichotomy of a developing country, excesses in hypercaloric food low in nutrients, this should lead to a supervisory analysis of healthy eating styles, through the Mobile Zörac , and not only focus on OySP, support should be provided in both dichotomous pathologies, malnutrition and OySP.

## CONCLUSION

This research carried out through Mobile Zörac, demonstrates a social reality of the Mexican child context, at a first level, it shows the serious problem of OySP, which is greater than that reported by the State health authorities, together with the permanent dichotomy of malnutrition where both groups suffer from pathologies that must be addressed immediately, in a second level, the cave-dwelling technological situation that the country is experiencing, as it does not have all the basic and technological elements such as the internet or electronic devices, which At this time of the 4.0 Revolution, it shows a country that is far from all technological modernization, in groups as specific as 8 to 12-year-old schoolchildren, at a third level, the COVID 19 pandemic showed the fragility of governments current because they do not have the basic needs of their groups, updated and clear information about what was happening, political decision-making on confinement, s In clear objectives of promoting healthy lifestyles, only postponing community infections by submerging groups in lag and oblivion, this is why this Zörac Mobile application should help to continue with clear approaches to complex actions to combat OySP.

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