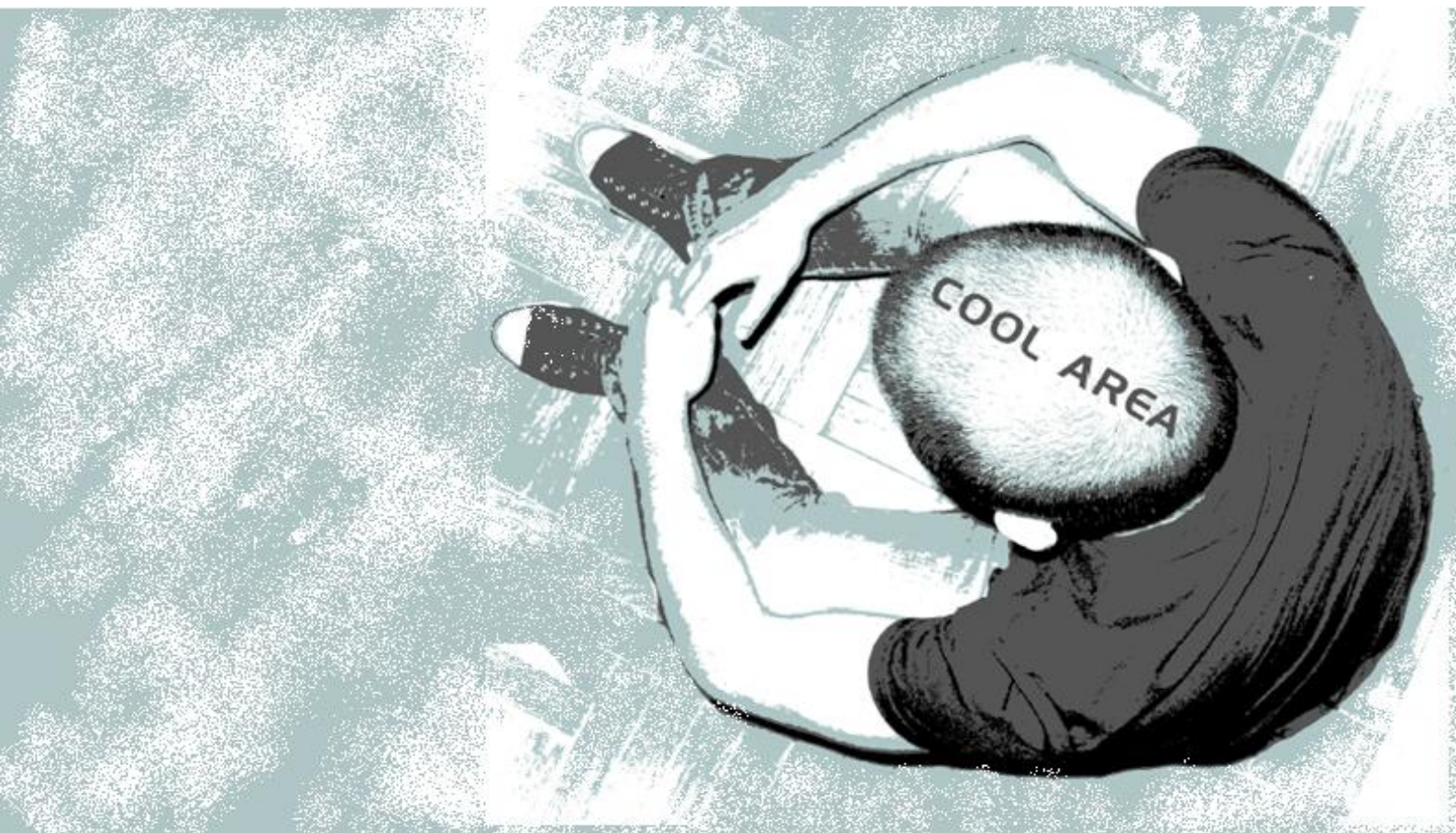


DEVELOPMENT, IMPLEMENTATION & EVALUATION OF A SCHOOL-BASED HELMET PROMOTION PROGRAM



University of Athens
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Center for Research and Prevention of Injuries
(CE.RE.PR.I)



**DEVELOPMENT, IMPLEMENTATION & EVALUATION OF A SCHOOL-BASED
HELMET PROMOTION PROGRAM**

The APOLLO Project (Contract No: 2004119)

Working Package 5: “Initiatives for interventions of the Public Health Sector to prevent accidents among vulnerable road users”

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EXECUTIVE SUMMARY

Injury prevention has seen over the years prominent examples of effective strategies, stemming mainly from the field of road traffic safety. Although, however, the theoretical effectiveness of these measures is now established, their adoption and systematic use by the general population is significantly hindered under real-life conditions. Thus, although, for instance, two-wheel motorized vehicle helmet use is the single most effective measure available against head and brain injuries, helmet wearing rates in many countries of the European Union Region still remain rather low. This realization necessitates the development and implementation of well-articulated, theory-based educational programs, aiming not only to raise individuals' awareness on the efficacy of such measures, but also to reduce injury risk behaviours, particularly among the so called "hard-core" population groups, such as adolescents.

This report aims to present in a distinct and comprehensive way the multi-faceted process of educational program planning. Specifically, guided by results deriving from qualitative research with young two-wheel motorized vehicle users in Greece, we opted to apply the key concepts of the Health Belief Model in the development and implementation of a school-based helmet promotion program targeting eligible adolescent drivers. The "Stick it well on your head!" program was developed in the context of the European Commission co-funded project APOLLO ("Strategies and Best Practices for the Reduction of Injuries") and had an estimated duration of one month. A specially trained member of the Center for Research and Prevention of Injuries (CE.RE.PR.I.), Athens University Medical School, in collaboration with the school teachers, delivered the program to a total of 100 high-school students attending the second grade of two randomly selected public secondary schools in middle-income areas of Athens, Greece.

Program evaluation, which was included as an integral component of the program planning, allowed us to conceptualize in a concrete and tangible manner the degree of the program's impact. Hence, by measuring students' self-reported knowledge, attitudes and behaviour regarding helmet use in two different instances, namely prior and after the intervention, noticeable and statistical significant positive changes were observed in all measured categories, enabling us to conclude that the program was effective in reaching the objectives for which it was established. In particular, among students attending the first school, mean values of knowledge, attitudes and behaviour scores increased after the intervention by 30.8%, 7.2% and 13.5%, respectively, whereas, among students attending the second school, the same mean values increased by 20%, 2.7% and 8.6%, respectively.

Experience gained through the development, implementation and evaluation of a theory-based educational program could serve as a useful guide for injury prevention researchers

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wishing to promote the adoption of safe behaviours among high-risk population groups. The methodology followed in the context of this study could be easily replicated in various settings, whereas the material produced could prove a valuable toolkit for practitioners.

1. INTRODUCTION

1.1 WHY FOCUS ON TWO-WHEEL MOTORIZED VEHICLE INJURIES?

Although often preventable, road crashes involving two-wheel motorized vehicles (TWMVs) pose a significant public health problem in many countries around the world. In Malaysia, for instance, TWMV-related fatalities comprise about 60% of overall traffic fatalities (Umar, 2002), while this figure lies between 70-90% in Thailand (Suriyawongpaisal and Kanchanasut, 2003). In a developing country like China, also, TWMV ownership grew rapidly from 23% in 1987 to 63% to 2001 and so did the proportion of TWMV-related fatalities, which rose from 7.5% to an estimated 19% (Zhang et al., 2004).

But the problem does not refer solely to low- and middle-income countries of the world. In the industrialized European Union (EU) Region, where TWMV use rates are considerably lower than those in developing countries, more than 6,500 citizens die each year due to a TWMV-related crash, whereas the risk of dying for motorcycle and moped users is 20 times higher than for car occupants (Peden et al., 2004). Given the increasing popularity of TWMVs as a convenient means of transport, the proportion of TWMV-related fatalities has increased significantly in most of the EU countries. In France, for example, the proportion of traffic fatalities sustained by motorcycle and moped users rose from 13% in 1995 to 22% in 2004, while in Denmark from 10.8% to 18.7%. Even in a country like Sweden, which has reached an enviable road traffic injury prevention record, fatalities sustained by TWMV users more than doubled over the same period (ERSO, 2006).



1.2 HOW EFFECTIVE IS HELMET USE?

About 80% of motorcycle and moped users killed on European roads had sustained a serious injury to the head; in almost half of these cases, the head injury was the main cause of death (ERSO, 2006). TWMV helmet use aims to protect riders from the risk and severity of such injuries, by reducing the impact of a force or collision to the head (WHO, 2006). But how effective is helmet use in reducing head injuries and TWMV-related fatalities?

Results from a nationwide study conducted in Greece suggest that an estimated 40% of TWMV deaths could have been averted every year if all riders were to use safety helmets (Petridou et al., 1998). Apart from theoretically-based estimations, however, there is practical experience confirming that correct helmet use can result in large public health benefits. Hence, in the Romagna region, north-eastern Italy, a 66% decrease in admissions of traumatic brain injury for TWMV crashes was observed after the introduction of a revised mandatory helmet law; in addition, traumatic brain injury admissions to neurosurgical hospital units decreased by 31%, whereas a fall to almost zero was noted in the number of blunt impact head injuries among injured moped users admitted to hospital (Servadei et al., 2003).

Moreover, the enactment of a federal road safety law in Spain led to a decrease of 25% in the motorcycle crash mortality and a reduction of 9% to the proportion of deaths with severe head injuries (Ferrando et al., 2000). Notwithstanding the great impact of helmet use in terms of lives saved, financial gains should also be considered. Thus, a study conducted in Michigan, United States of America, found out that helmet use decreased mean cost of hospitalization by more than 20%, namely more than US\$ 6,000 per patient (Brandt, 2002).

QUICK FACTS ABOUT TWMV-RELATED INJURIES:

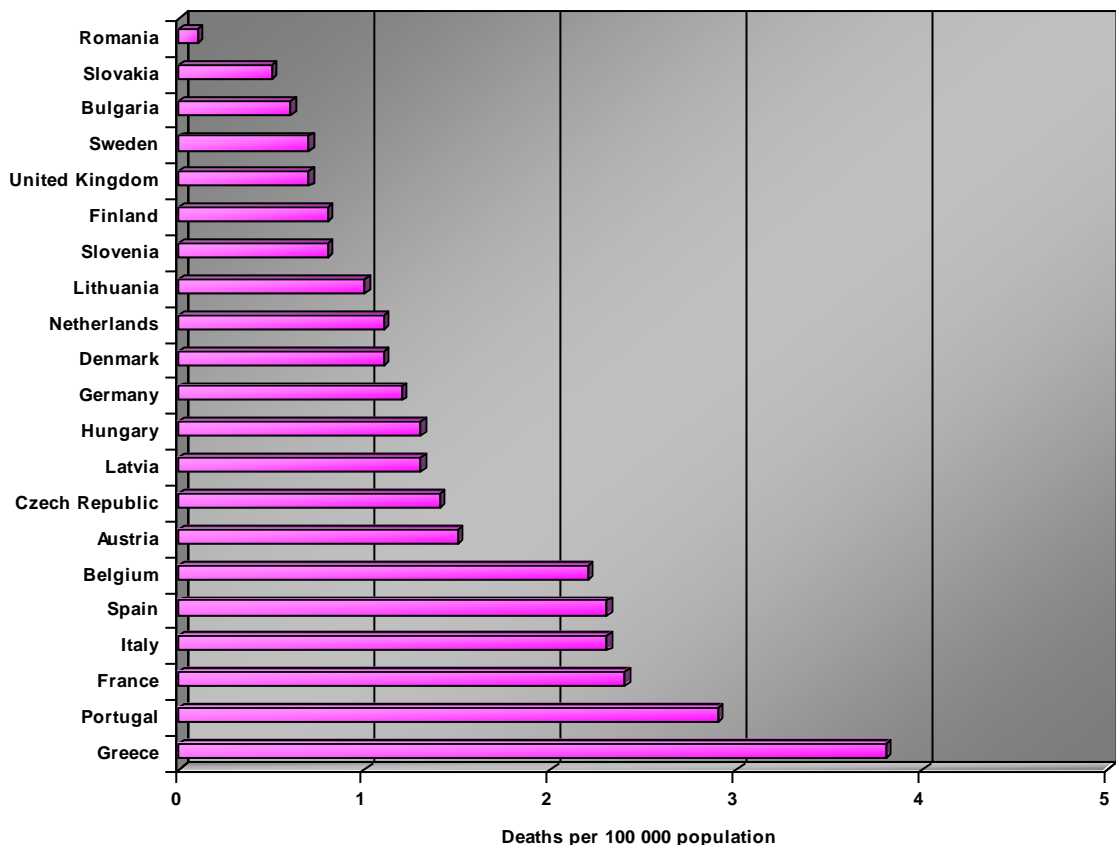
- More than 6,500 EU citizens die each year due to a TWMV-related accident.
- In France, Greece, Italy and Portugal, more than 20% of the total number of road accident fatalities concern TWMV users.
- In Sweden, the proportion of traffic fatalities sustained by TWMV users rose from 7% in 1995 to 15% in 2004.
- About one third of TWMV users killed in fatal road crashes in Greece, France and Finland are adolescents and young adults.

2. PROGRAM DEVELOPMENT

2.1 BACKGROUND

In countries of Southern Europe, such as France, Greece, Italy and Portugal, TWMVs are widely used, since, on one hand, they constitute a relatively inexpensive and convenient mode of transport and, on the other, Mediterranean climate favours their use. They are particularly popular among the youth who may use mopeds from the age of 14 or 16 years, depending on the country-specific legislation. This increase, however, in exposure has subsequently led to increased mortality rates, with Mediterranean countries suffering from the highest mortality due to TWMV-related injuries among all EU countries (see Figure 1).

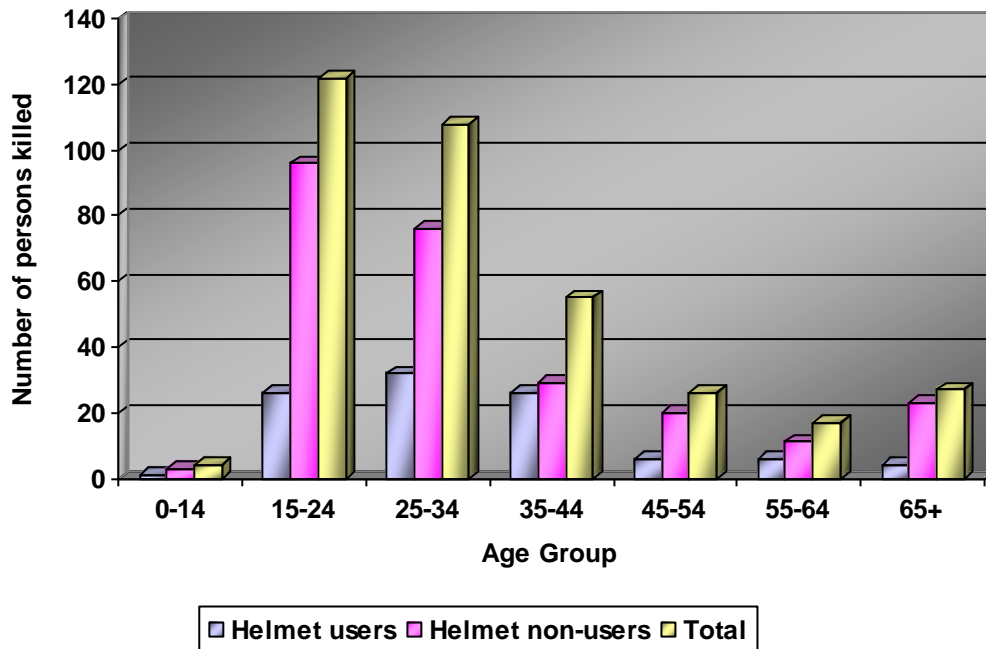
Figure 1. Standardized mortality rates for motorcycle injuries among people 0-24 years in selected EU countries (average of the last available three years; circa 2002-2004)



Source: World Health Organization

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Figure 2. TWMV users killed in fatal road crashes in Greece during 2004, by age group and helmet use



Source: National Statistical Service of Greece

In Greece, where about 1 in 10 people owns a moped or a motorcycle, more than 25% of the total number of road accident fatalities concern TWMV users (ERSO, 2006). In absolute numbers, this percentage is translated to an estimated 350 people killed per year, of whom approximately one third are aged 15-24 years. This over-representation of adolescents and young adults in casualty statistics has been often associated with their tendency to engage in riskier driving behaviours than older adults, such as non-use of helmets (Bonino et al., 2005; Lin et al., 2003; Rutter and Quine, 1996). Although helmet use has been mandatory in Greece since 1977, compliance is considered to be extremely low with helmet wearing rates among adolescents reaching no more than 20%, as estimated from studies conducted in the Greater Athens area (Petridou et al., 1998; Skalkidou et al., 1999). Indeed, according to data from the National Statistical Service of Greece, nearly 80% of youngsters killed in fatal road crashes during 2004 were not using a helmet at the time of the event (see Figure 2).

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2.2 SCOPE AND OBJECTIVES

Considering the limited compliance of adolescent TWMV users towards existing helmet wearing laws, a school-based educational program was developed by the Center for Research & Prevention of Injuries (CE.RE.PR.I), Athens University Medical School, in order to facilitate and promote TWMV helmet use among high-school students attending the second grade (~16 years), and therefore eligible to obtain a driving license for a moped. The program, entitled “Stick it well on your head!”, consisted of four hourly sessions, divided into four successive weeks. The content and desired objectives of each session are summarised in Table 1. Specifically, the program sought:

- To raise students’ awareness on the burden of TWMV-related injuries,
- To emphasize the safety benefits conferred by helmets,
- To inform students on the correct use of helmets, and
- To encourage routine helmet use by eliminating students’ perceived barriers.

Table 1. Content and objectives of learning activities

	Content	Objectives
Session 1	Introduction to the program, Discussion with students, Power Point presentation showing the magnitude of the problem in Greece and other EU countries	To raise students’ awareness on the magnitude of TWMV-related injuries
Session 2	Presentation of helmet instructional video, Practise helmet fitting, Checklist for correct helmet use	To inform students on the correct use of helmets and on the efficacy of helmets in reducing the risk of serious and fatal injuries
Session 3	Discussion on the pros and cons of helmet use, Review of the decision-making process, Role-playing activities	To encourage routine helmet use among students by eliminating their perceived barriers to helmet use
Session 4	Closure of the program, Program review and evaluation, Presentation of students’ video-recorded role-playing activities	To review main points and to identify strengths and limitations of the program

2.3 THEORETICAL FRAMEWORK

The theoretical framework used for the development of the program was the Health Belief Model (HBM), a widely applied psychological model that attempts to explain and predict health behaviours by focusing on the attitudes and beliefs of individuals (Rosenstock, 1966; 1974). The HBM, which was first developed in response to the failure of a free tuberculosis health screening program during the 1950's, has been recently adapted to explore a wide variety of long- and short-term health behaviours, including sexual risk behaviours and the transmission of HIV/AIDS (Lollis et al., 1997; Yep, 1993), practice of preventive behaviours against the severe acute respiratory syndrome (Wong and Tang, 2005), as well as adoption of injury preventive measures (Lajunen and Räsänen, 2004; Williams-Avery and MacKinnon, 1996).

In general, the HBM proposes that a person will engage in a health-related action, i.e. wear a helmet, if that person: a) perceives himself/herself susceptible to a disease or an injury and believes that its consequences will be severe (*threat perception*), b) feels that the benefits of the recommended action outweigh the barriers (*behavioural evaluation*), c) believes that he/she is able to successfully perform the recommended action (*self-efficacy*) and d) receives positive cues concerning the recommended action (*cues to action*). These concepts were applied to guide both the content and the specific objectives of each program session. Therefore, the first session aimed to heighten adolescents' perceived susceptibility of a TWMV-related accident and specify consequences of the risk through the use of a Power Point presentation showing the magnitude of the problem in Greece (see Appendix 1). Likewise, the second session sought to provide training and guidance in performing the recommended action by giving students the opportunity to practise helmet fitting in class, whereas the third session aimed to eliminate students' perceived barriers and encourage routine helmet use through the use of activity sheets and role-plays. Finally, cues to action were accomplished by using incentives and reminder messages, such as hard copy take home materials and posters.

2.4 DEVELOPMENT OF EDUCATIONAL MATERIAL

Formative research conducted as part of the APOLLO WP-3 Project ("How to overcome the barriers to implement recommendations for youth injury prevention: the case of road traffic injuries") revealed that peer pressure and beauty and style reasons were among the most important factors hindering routine helmet use among adolescent TWMV users. Peer pressure usually involved negative comments from peers about helmet wearing, while beauty and style reasons had to do with concerns about the damage that helmets may cause to the physical appearance of adolescents. Complaints like "the helmet disturbs the shape of my hairstyle" were commonly expressed among adolescents, who generally tend to pay a lot of attention to their image.

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Poster 1. "I don't wear a helmet... it messes up my hair"



To this end, two posters were designed addressing adolescents' perceived barriers to helmet use. Poster 1 carried the message "I don't wear a helmet... it messes up my hair" and illustrated a girl holding a comb to her neck as a lethal weapon. The text below the message stated that about 80% of TWMV users getting killed in fatal road crashes have sustained a head injury and that helmet use can reduce the risk and severity of such injuries by 72%. The key message of the poster was: "Stick it well on your head; helmet use could save your life", a culturally-based colloquialism¹ which in Greek could mean either that helmets should be worn correctly or that youngsters should realize the necessity of helmets when riding TWMVs. Likewise, Poster 2, presenting the inscription "Cool area" on a young man's head, carried the message "I don't wear a helmet... it ain't cool", whereas the text below it stated the following: "Fatal TWMV-related accidents comprise more than 25% of all road traffic fatalities. Each year, about 350 TWMV users lose their lives due to a road crash. One third of them are aged 15-24 years". Again, the key message of the poster was: "Stick it well on your head; helmet use could save your life".

¹ A colloquialism is an informal phrase used to describe something within a certain cultural group (Witte et al., 2001). For instance, every group has its own lingo that it is immediately understandable to the members of that group, but may be incomprehensible to people outside that group. Culturally-based colloquialisms have been widely used in health promotion and health education, since they are considered to make the message more persuasive by "tailoring" it to the culture and lifestyle of a specific population.

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Poster 2. "I don't wear a helmet... it ain't cool"



Apart from the posters to be displayed at the classrooms and the schoolyard, an educational leaflet was developed to be distributed at the end of the first session. The leaflet contained several wide-spread myths about the use of helmets, for instance “helmets disturb the vision and the hearing” or “helmet use cannot protect the rider in case of a serious road traffic injury”, and presented the respective truths. In addition, a helmet instructional video was produced to be presented to the students through a wall projector. The video conveyed information on how to wear a helmet correctly, what is the most appropriate type of helmet, when a helmet should be discarded, etc.

Draft materials were pilot-tested with a group of twelve 16-year-old students (five males and seven females) attending a public secondary school in the Greater Athens area. The objectives of the pilot-testing were: a) to assess clarity of messages, b) to ensure acceptability of materials among the target audience, and c) to test effectiveness of materials in raising young people’s awareness. Overall, it appeared that all materials developed were age-appropriate and attractive to adolescents, while the majority reported that they were successful in raising their awareness regarding the protective effect of helmets and their correct use. Minor changes suggested by the students included simplifying the wording of the leaflet’s text and accelerating the tempo of the video. After incorporating these improvements, the final version of materials was produced.

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Educational leaflet on myths and truths about helmet use

Τα κράνη προστατεύουν μόνο μέχρι την ταχύτητα των 20 χλμ/ώρα αφού σε αυτήν την ταχύτητα γίνεται οι δοκιμασίες σύγκρουσης.

Τα κράνη δοκιμάζονται σε αυτή την ταχύτητα, αλλά σχεδιάζονται για να αντέχουν σε μεγαλύτερες ταχύτητες. Κάθε αντίστοιχο συμβάνει και με τα αυτοκίνητα. Οι δοκιμασίες σύγκρουσης γίνονται με ταχύτητα 50 χλμ/ώρα, οι ζώνες ασφαλείας όμως μας προστατεύουν και σε αντήκτα με μεγαλύτερη ταχύτητα.

**αλήθειες για τη
5+1 χρήση κράνους**



**βαλ'το καλά
στο κεφάλι σου**



ΤΟ ΚΡΑΝΟΣ ΣΩΖΕΙ ΖΩΕΣ



**Βαλ'το
καλά στο
κεφάλι
σου**



**ΤΟ ΚΡΑΝΟΣ
ΣΩΖΕΙ ΖΩΕΣ**

ΜΥΘΟΣ VS ΑΛΗΘΕΙΑ

Τα θανατηφόρα ατυχήματα με μοτοσυκλίδες αντιπροσωπεύουν ένα μικρό ποσοστό των θανατηφόρων τροχαίων ατυχημάτων.

Στη χώρα μας, τα θανατηφόρα ατυχήματα με μοτοσυκλίδες καταλαμβάνουν το 25% όλων των θανατηφόρων τροχαίων ατυχημάτων. Πρακτικά, αυτό σημαίνει ότι κάθε χρόνο χάνουν τη ζωή τους σε κάποιο ατύχημα περίπου 350 μοτοσυκλισταί. Ένας στους τρεις είναι ηλικίας 15-24 ετών.

Τα κράνη δεν μπορούν να προστατεύουν έναν μοτοσυκλιστα από τον κίνδυνο σοβαρού ή θανατηφόρου ατυχήματος.

Το 80% των μοτοσυκλιστατών που πέσανε από τροχαίο ατύχημα, έχει υποστεί τραυματισμό στο κρανίο, ενώ στις μισές από αυτές τις περιπτώσεις η κρανιοεγκεφαλική κάλυψη είναι η κύρια αιτία θανάτου. Έρευνες δείχνουν ότι τα κράνη μπορούν να μειώσουν τον κίνδυνο και τη σοβαρότητα πιθανών τραυματισμών κατά 72%, και την πιθανότητα θανατηφόρου ατυχήματος κατά 39%.

Τα κράνη μειώνουν την ορατότητα και την ακουστική αίσθηση του μοτοσυκλισταί.

Τα κράνη που πέρχονται τις προδιαγραφές παρέχουν 210 μοίρες ορατότητα, γινάτα που ισοδυναμεί με τη φυσολογική περιφερική όραση. Επίσης, ένα μπορεί να μειώσει την ένταση των θορύβων, δεν επηρεάζουν την ικανότητα του μοτοσυκλισταί να διακρίνει ανάμεσα σε διαφορετικούς ήχους. Όταν, μάλλον, είναι σωστά ταποθετημένα, βελτιώνουν την ακουστική αίσθηση του οδηγού, καθώς μειώνουν τον θόρυβο του αέρα.

Λόγω του σχήματος και του μεγέθους τους, οι μοτοσυκλίδες αποτελούν το πιο ασφαλές μέσο μεταφοράς.

Για κάθε 1,5 χλμ οδηγώντας, ένας μοτοσυκλισταίς κινδυνεύει 16 φορές περισσότερο να πεθάνει σε μια σύγκρουση από ότι ο οδηγός ενός αποικουδητούσ αλλου οχήματος. Λόγω της καλύτερης σχέσης κέντρου έπιππων που έχουν σε σύγκριση με την πλειοψηφία των αυτοκινήτων που κυκλοφορούν, οι μοτοσυκλίδες είναι ικανές να αναπτύξουν μεγαλύτερη επιταχυνση και τακτικές ταχύτητες από τα αυτοκίνητα, ενώ το σχήμα και το μέγεθος τους δεν ευνοεί την ορατότητά τους στο οδικό περιβάλλον.

Δεν αγοράζω κράνος, γιατί είναι πολύ ακριβό.

Το κόστος για την αγορά ενός κράνους που πληροί τις προδιαγραφές μπορεί να είναι υψηλό, αλλά το κόστος για μη χρήση κράνους είναι ακόμα πιο υψηλό. Σύμφωνα με τον Κώδικα Οδικής Κυκλοφορίας οι μη χρήστες κράνους υποχρεούνται να καταβάλουν ένα πρόσο των 350 Ευρώ, ενώ τους αφαιρέματα η διάρκεια οδήγησης για 10 ημέρες.



3. PROGRAM IMPLEMENTATION

Invitation letters were sent to the Principals of two randomly selected public secondary schools, located in two different middle-income areas of the Greater Athens area. The letters comprised a short description of the program, underlining its significance in adolescent health promotion, and asked the Principals to give permission for implementing it at their school settings, while indicating the following:

- The number of classes comprising the second grade,
- The number of students attending each class,
- The days and hours when the program could be implemented for each class, and
- The names and speciality of teachers interested in participating to the program.

Both Principals accepted to implement the program and gave all the requested information. The first school had three classes in the second grade with a total of 33 students enrolled (9 students comprising the first class, 10 students comprising the second and 14 students the third). Likewise, the second grade of the second school consisted of three classes, whereas a total of 74 students were enrolled (~24 students attending each class). After agreeing on the specific dates when the program could be implemented for each school class, teachers willing to participate -including mainly teachers of Physical Education- were contacted in order to gain a more detailed and focused description of each program session.

The program was carried out during 2008. To enhance communication and encourage active participation on behalf of the students, a specially trained member of our team, in collaboration with a school teacher, delivered the “Stick it well on your head!” program separately to the students of each class. Since participation to the program was voluntary, a total of 100 students (48 males and 52 females) agreed to participate out of the 107 enrolled in both schools.

4. PROGRAM EVALUATION

4.1 AIM AND OBJECTIVES

In general, the term “program evaluation” refers to the systematic application of research procedures to assess the conceptualization, design, implementation and utility of health promotion programs (Rossi et al., 1999). It is used to determine which programs have been effective and how they achieved that effectiveness, thus enabling researchers to plan and implement more effective programs in the future. Evaluation is an important process and should be included as an integral component of the health promotion planning, because it both improves the probability of creating a successful program, by prompting project planners to establish specific goals and objectives, and enables researchers to understand the effect -if any- of a program (Valente, 2002).

Hence, the primary aim of evaluating the “Stick it well on your head!” program was to determine its effectiveness in meeting the objectives for which it was established. Specifically, we sought to assess the impact of the program on changing students’ self-reported knowledge, attitudes and behaviour regarding TWMV helmet use.

WHY EVALUATE HEALTH PROMOTION PROGRAMS?

- To measure the degree of a program’s impact
 - To define specific goals and set measurable objectives for the program
 - To understand which aspects of the program worked and which didn’t
 - To provide guidance for future program activities
-

4.2 METHODS

4.2.1 Design

A 37-item questionnaire was designed and distributed to the 100 participating students before and after the intervention. In addition to basic socio-demographic information (age, sex, school, parental income and school performance), the questionnaire included: 5 multiple choice questions addressing riding patterns of participants, 10 true/false questions addressing participants' knowledge regarding helmet use, 10 five-point Likert scale questions ranging from "fully agree" to "fully disagree" and addressing participants' attitudes regarding helmet use and another 10 five-point Likert scale questions ranging from "fully agree" to "fully disagree" and addressing participants' behaviour regarding helmet use (see Appendix 1). Recall of safety knowledge presented in the context of the program was selected as the key evaluator of its impact.

Face and content validity of the instrument was assessed by an expert panel consisting of two paediatricians, three psychologists and one biostatistician. In order to ensure ease of completion and clarity in the interpretation, the questionnaire was initially pilot tested at one of the schools where the program was implemented (n=10). It took approximately 10 to 13 minutes to complete. Because no major changes were made as a result of the pilot, the data from those students were included in the final analysis.

4.2.2 Statistical analyses

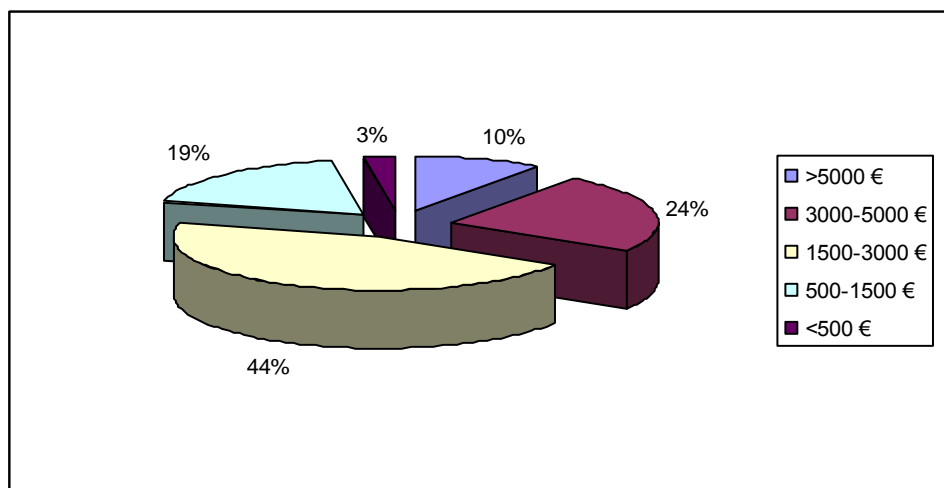
Statistical analyses were conducted separately for each of the three grade categories (knowledge, attitudes, behaviour). Each of the variables of knowledge section was graded with either "0", if the corresponding response was correct, or "1", if the corresponding response was wrong. Subsequently, a knowledge score (rating from 0 to 10) was calculated as the sum of the above variables. Variables of attitudes and behaviour sections were graded according to five-point Likert scale with "1" indicating the worst answer and "5" the best. The two scores were calculated by adding the corresponding variables (rating from 10 to 50). Mixed effect models with fixed effect of school and random effect of subject were used to estimate differences in mean scores for students before and after the intervention. This analysis takes into account the clustering of students in schools and the baseline findings of each student. The derived results were adjusted for gender, financial status, school performance, frequency of using a TWMV as a driver and frequency of using a TWMV as a passenger. The SAS statistical software version 9.1 was used for analysis (SAS Institute Inc, 1989).

4.3 FINDINGS

4.3.1 Sample description

All 100 questionnaires distributed in class were completed and returned; however, only 80% of pre- and post-questionnaires were finally matched. Among participants with matched pre- and post-questionnaires available (n=80), 35 (44%) were males and 45 (56%) were females, with a mean age of 16.2 years (SD=0.5). Almost half of them (44%) belonged to the middle socio-economic class, whereas: 24% to the middle to high, 10% to the high and 22% to the low (see Figure 3). With regard to their school performance, 14% reported that their last annual school report was excellent (18.1-20.0), 35% that it was very good (16.1-18.0), 40% that it was good (13.1-16.0) and 11% that it was fairly good (9.5-13.0).

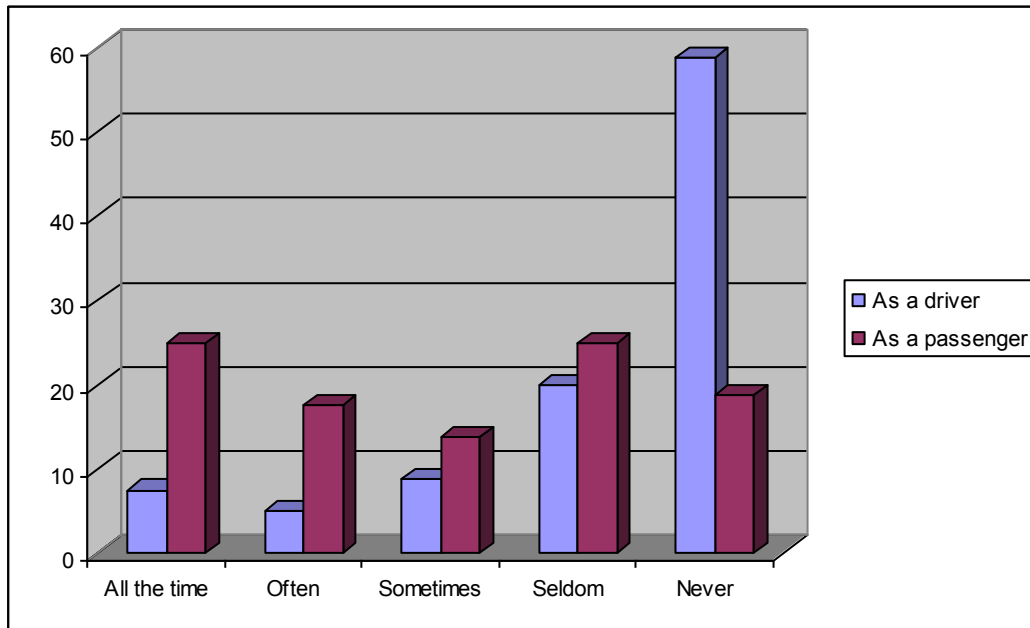
Figure 3: Participants' self-reported mean monthly parental income (n=80)



As far as the TWMV-related behaviour of respondents is concerned, more than half (58.8%) stated that they had never driven a moped or a motorcycle in their life, whereas 7.5% stated driving a TWMV all the time (i.e. at least three times per week), 5% often (i.e. at least three times per month), 8.8% sometimes (i.e. at least three times per six months) and 20% seldom (i.e. at least three times per year). Nevertheless, using a TWMV as a passenger appeared to be the case, since more than 42% of students reported riding frequently as a passenger (see Figure 4). Among participants reporting using a moped or a motorcycle (n=65), only one had a private TWMV, while: 30.8% used their parents' TWMV, 10.8% their brother's/sister's, 15.4% another family member's, 26.2% a peer's, 3.1% a younger friend's and 12.3% an older friend's. Furthermore, 2 students answered that they had already obtained a driving license for a moped and 26 (40%) that they intend to obtain one in the future.

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Figure 4: Self-reported TWMV use by participating students (n=80)



4.3.2 Changes in students' knowledge, attitudes and behaviour

Participation of students to the “Stick it well on your head!” program was associated with noticeable and statistical significant positive changes in all measured categories, namely knowledge, attitudes and behaviour regarding TWMV helmet use. Specifically, among students attending the first school, mean values of knowledge, attitudes and behaviour scores, prior to the intervention, were: 6.79 (SD=0.50), 41.66 (SD=2.23) and 35.99 (2.91), respectively, whereas, after the intervention, were: 8.88 (SD=0.50), 44.65 (SD=2.26) and 40.83 (SD=2.91), respectively (see Figure 5). Among students attending the second school, statistical significant positive changes were noted in knowledge and behaviour; mean values of knowledge, attitudes and behaviour scores, prior to the intervention, were: 7.66 (SD=0.41), 42.53 (SD=1.91) and 38.70 (SD=2.57), respectively, whereas, after the intervention, were: 9.19 (SD=0.41), 43.66 (SD=1.90) and 42.02 (SD=2.55), respectively (see Figure 6). When derived results were adjusted for gender, parental income, school performance and frequency of TWMV use either as a driver or as a passenger, none of the five variables was found to have a statistical significant effect on the measured categories.

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Figure 5: Changes in self-reported knowledge, attitudes and behaviour regarding helmet use among students attending the first school

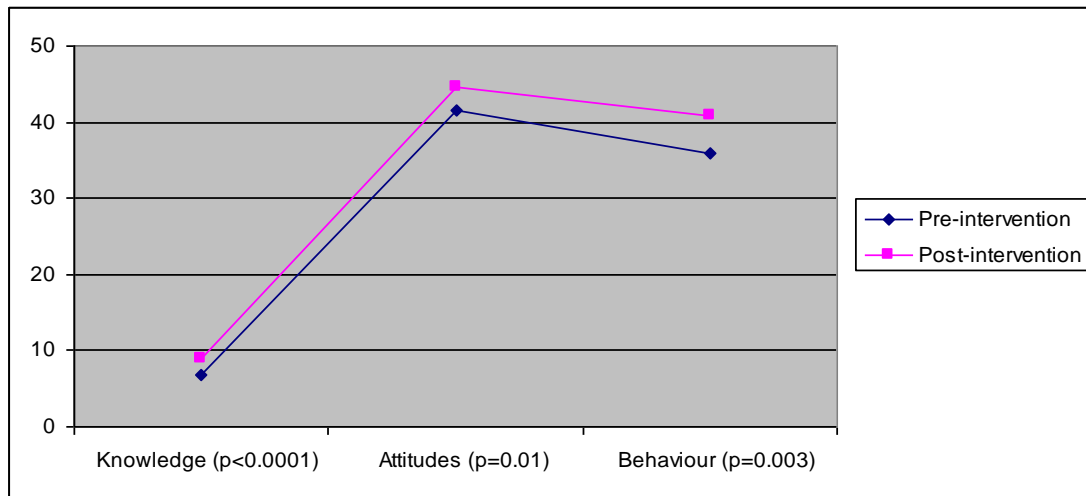
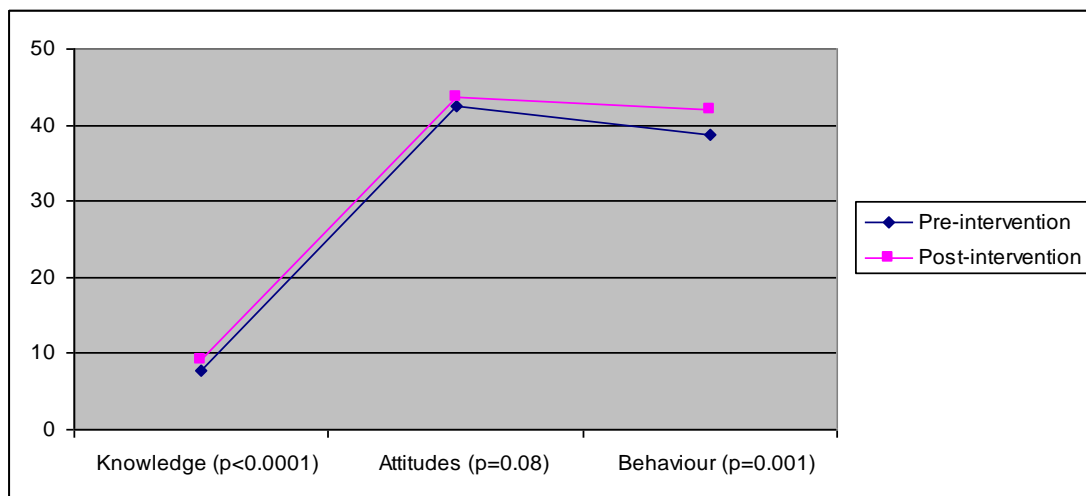


Figure 6: Changes in self-reported knowledge, attitudes and behaviour regarding helmet use among students attending the second school



5. CONCLUSIONS

Unintentional injury prevention has traditionally been more reliant on passive safety than on active protection, with considerable research attention being paid to the identification of environmental risk factors and the development of safety technologies (Gielen and Sleet, 2003). Particularly in the field of road traffic safety, a cumulative body of evidence currently exists supporting the effectiveness of passive strategies in reducing the injury death toll (Kopjar, 2000; Petridou et al., 2007; Schulman et al., 2002). Despite the theoretical effectiveness of these measures, however, their implementation at population level has been significantly hindered under real-life conditions (Petridou and Alexe, 2004). Thus, although, for instance, helmet use has been shown to reduce the risk and severity of TWMV-related head injuries by up to 72% (Liu et al., 2004), helmet wearing rates among youngsters residing in the EU Region are rather low. This realization necessitates the development and implementation of well-articulated, theory-based educational programs, aiming not only to raise individuals' awareness on the efficacy of such measures, but also to reduce injury risk behaviours, particularly among the so called "hard-core" population groups, such as adolescents.

This report sought to present in a distinct and comprehensive way the multi-faceted process of educational program planning. Specifically, guided by results deriving from a sizeable number of focus group discussions with young TWMV users, we opted to use a widely applied psychological model in order to design and implement a school-based helmet promotion program targeting adolescents eligible to obtain a driving license for a moped. The "Stick it well on your head!" program was eventually delivered by a specially trained member of CE.RE.PR.I., and in collaboration with school teachers, to a total of 100 high-school students attending the second grade of two randomly selected public secondary schools in middle-income areas of Athens, Greece. The rationale for focusing on middle socio-economic class students was to determine the effectiveness of the program in awareness raising and behaviour change of "typical" Greek adolescents, as contrasted to those originating either from more privileged or less resourced families, thus comprising minority population groups.

Program evaluation, which was included as an integral component of the program planning, allowed us to conceptualize in a concrete and tangible way the degree of the program's impact. Hence, by measuring students' self-reported knowledge, attitudes and behaviour regarding TWMV helmet use in two different instances, namely prior and after the intervention, noticeable and statistical significant positive changes were observed in all measured categories, enabling us to conclude that the program was effective in reaching the objectives for which it was established. In particular, among students attending the first school, mean values of knowledge, attitudes and behaviour scores increased after the intervention by 30.8%, 7.2% and 13.5%, respectively, whereas, among

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students attending the second school, the same mean values increased by 20%, 2.7% and 8.6%, respectively.

Key elements for the successful implementation of the “Stick it well on your head!” program appeared to be the harmonious co-operation with the school Principals and the active participation on behalf of the school teachers. By involving various stakeholders to the implementation of the program and by creating a spirit of collaboration with them, we accomplished to meet our objectives, namely to promote correct helmet use among participating students. Therefore, it seems necessary for injury prevention practitioners and researchers wishing to work with schools to develop a deep understanding and appraise both the structure and the dynamics of the school milieu (Franks et al., 2007). School environment has been often identified as a prosperous venue for public health improvement, whereas well-conceptualized school-based educational programs have been shown to be particularly effective in promoting the adoption of safety behaviours among the youth (Kendrick et al., 2007; Royal et al., 2005). Given the time and resource constraints, we managed to implement the program only in two schools of the Greater Athens area; future perspective, however, is the implementation and evaluation of the “Stick it well on your head!” program on a greater sample of adolescents deriving from different socio-economic classes and various regions of Greece.

Main points

- Formative research aiming to identify perceived barriers and facilitators to the recommended action among the target population contributes to the socio-cultural background needed for designing age- and population-tailored educational interventions.
- Involvement and active participation of various stakeholders (e.g. Principals, school teachers) can substantially facilitate the implementation of a school-based program.
- A young implementer who shares a deep understanding of the school milieu seems to be the most appropriate person to deliver safety messages to adolescents.

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ACRONYMS

TWMV Two-Wheel Motorized Vehicle

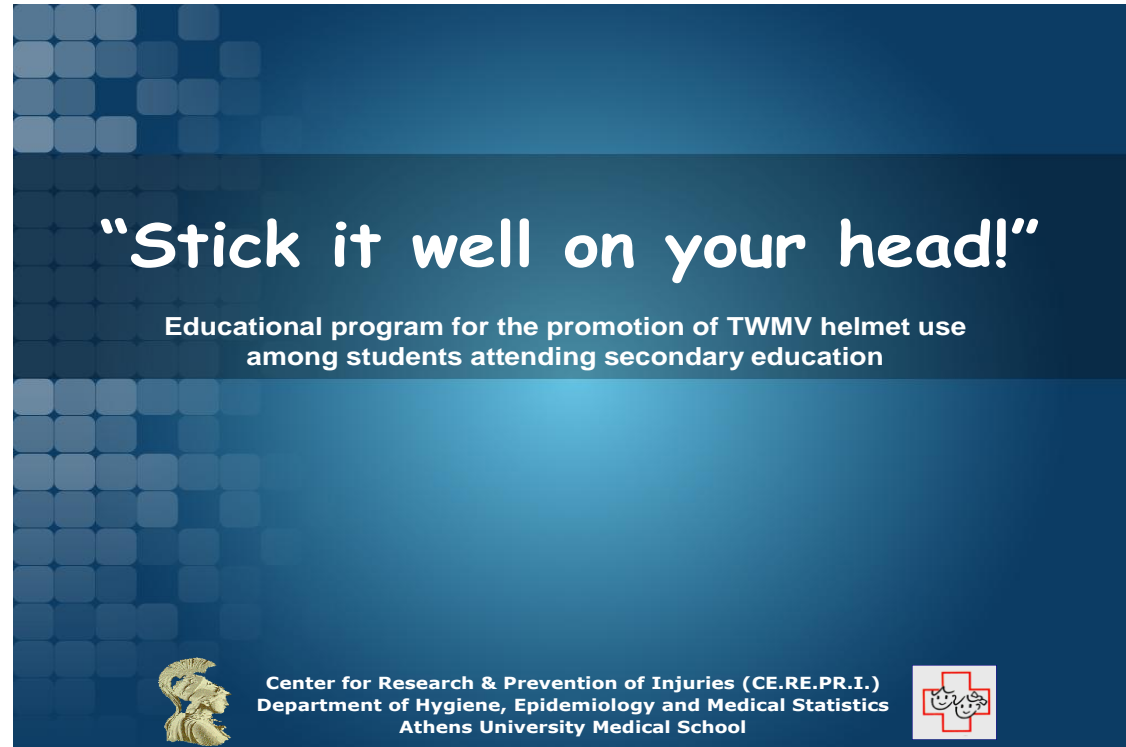
EU European Union

HBM Health Belief Model

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APPENDIX 1: Presentation



"Stick it well on your head!"


Educational program for the promotion of TWMV helmet use
among students attending secondary education

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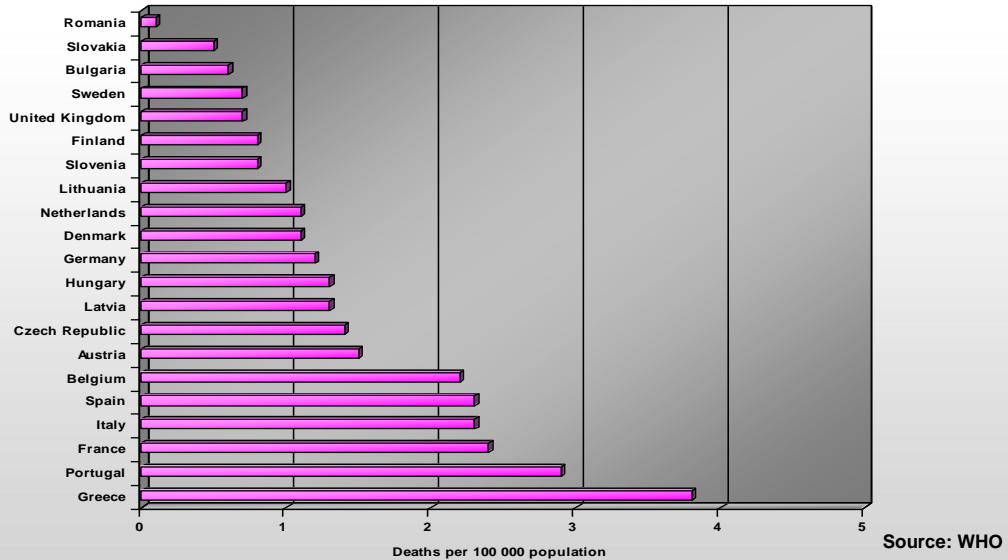
The history of motorcycles in Greece



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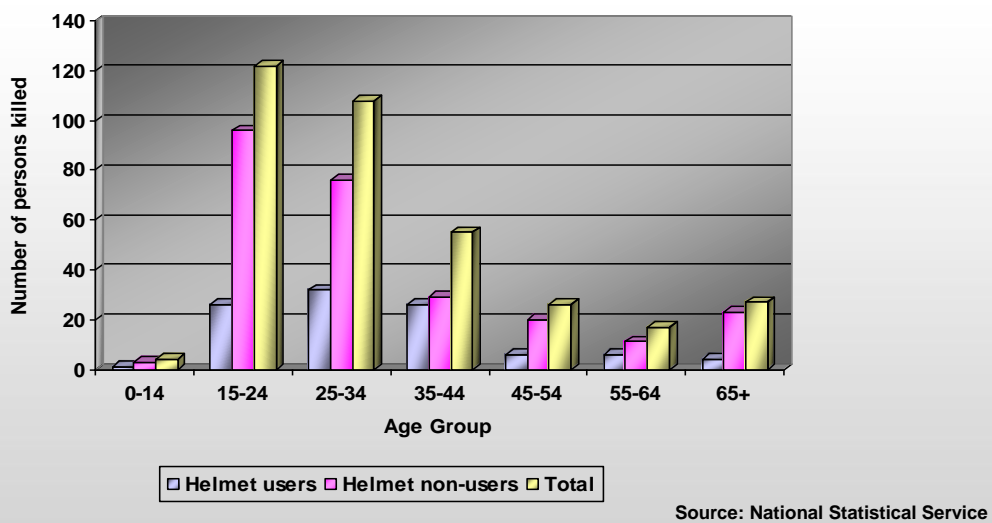
Standardized mortality rates for motorcycle injuries among people
0-24 years in selected EU countries



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TWMV users killed in fatal road crashes in Greece during 2004, by age
group and helmet use



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What helmets do:



- ✓ Helmets can reduce the risk and severity of head injuries by up to **72%**
- ✓ Helmets can reduce the risk of a fatal injury by up to **39%**



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What helmets DON'T do:



- ✗ Helmets are designed to reduce the chances of head, brain and facial injuries, but are not designed to protect the rider from injuries occurring to other parts of the body



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Why is helmet use important:



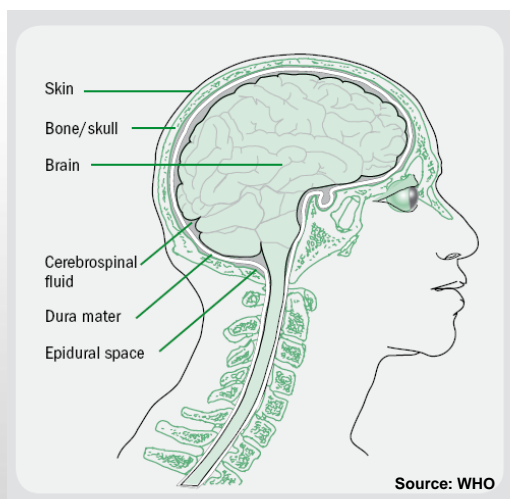
- About **80%** of motorcycle and moped users killed every year had sustained a serious injury to the head; in almost half of these cases, the head injury was the main cause of death



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How are head injuries caused:



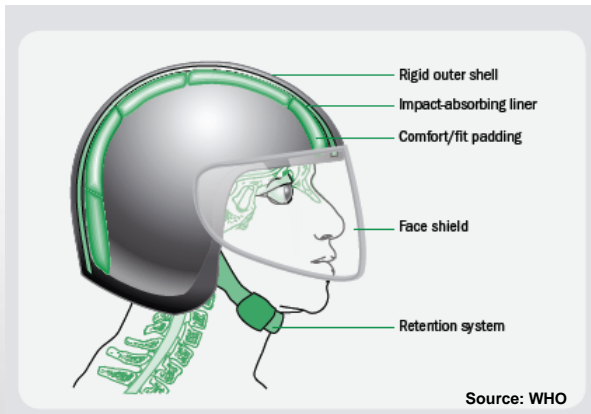
- When a rider is involved in a collision, he/she is usually thrown from the vehicle. If the rider's head hits an object, the head's forward motion is stopped, but the brain, having its own mass, continues to move forward until it strikes the inside of the skull.



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How a helmet works:



- A helmet aims to reduce the risk of serious head and brain injuries by reducing the impact of a force or collision to the head



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Some things that we should keep in mind:

1. A road traffic injury can happen to anybody...



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Some things that we should keep in mind:

2. Road traffic injuries are not caused by "bad luck" or random occurrences...



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Some things that we should keep in mind:

3. Most road traffic injuries are caused by factors like ignorance, under-estimation of the danger or over-estimation of our abilities...



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Some things that we should keep in mind:

4. By using simple, effective measures, like helmets, we can reduce significantly the risk and severity of such injuries...



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APPENDIX 2: Questionnaire

1. In Greece, TWMV-related fatalities comprise less than 10% of overall traffic fatalities.
 True False Don't know
2. The majority of TWMV users killed in fatal road crashes are aged 35-44 years.
 True False Don't know
3. Correct helmet use can reduce the risk and severity of head injuries by about 72%.
 True False Don't know
4. A helmet can last up to 20 years, unless it has sustained serious damages from drops.
 True False Don't know
5. A helmet is not necessary to have an approval mark since all helmets in stores have been checked for quality control.
 True False Don't know
6. Irrespective of their price, all helmets offer the same degree of protection.
 True False Don't know
7. The chin strap should be always fastened securely to maintain the helmet in position on the head.
 True False Don't know
8. Frequent helmet use can cause permanent hearing damages.
 True False Don't know
9. According to current legislation, helmet non-use is considered to be a traffic violation and is being punished with a fine of 350 €.
 True False Don't know
10. TWMV passengers are not obliged to wear a helmet.
 True False Don't know

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11. Helmet use is not needed when traveling short distances.

Fully agree Agree Neither agree nor disagree Disagree Fully disagree

12. Helmet use can protect me from a serious injury.

Fully agree Agree Neither agree nor disagree Disagree Fully disagree

13. Helmet use is not needed if a rider is careful or experienced.

Fully agree Agree Neither agree nor disagree Disagree Fully disagree

14. Wearing a helmet makes me feel ugly.

Fully agree Agree Neither agree nor disagree Disagree Fully disagree

15. Helmets are needed only when using motorcycles with more powerful engines.

Fully agree Agree Neither agree nor disagree Disagree Fully disagree

16. If I had a TWMV, I would prefer buying a disc wheel or an exhaust pipe than a helmet.

Fully agree Agree Neither agree nor disagree Disagree Fully disagree

17. I would encourage a friend of mine who had just bought a TWMV to also buy a helmet.

Fully agree Agree Neither agree nor disagree Disagree Fully disagree

18. All people using TWMVs, even if they don't drive themselves, should wear a helmet.

Fully agree Agree Neither agree nor disagree Disagree Fully disagree

19. I would wear a helmet, but I don't want my parents to know that I use a TWMV.

Fully agree Agree Neither agree nor disagree Disagree Fully disagree

20. People wearing helmets do not enjoy the fascination of riding.

Fully agree Agree Neither agree nor disagree Disagree Fully disagree

21. How often do you use a TWMV as a driver?

All the time (at least 3 times per week)

Often (at least 3 times per month)


Sometimes (at least 3 times per six months)

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- Seldom (at least 3 times per year)
- Never

22. How often do you use a TWMV as a passenger?

- All the time (at least 3 times per week)
- Often (at least 3 times per month)
- Sometimes (at least 3 times per six months)
- Seldom (at least 3 times per year)
- Never

 **If you answered “Never” in both of the above questions (21 and 22), skip questions 23-35 and go to question 36.**

23. The majority of times you have used a TWMV, it belonged to:

- Your parents
- Your brother/sister
- Another family member
- A friend of the same age as you
- A friend younger than you
- A friend older than you
- You

24. Do you have a driving license for a TWMV?

- Yes, I obtained it before _____ months / _____ years
- No

25. Do you intend to obtain one?

- Yes
- No
- Don't know

26. I wear a helmet every time I use a TWMV.

- Fully agree
- Agree
- Neither agree nor disagree
- Disagree
- Fully disagree

27. I usually wear my friends' helmets, even if they don't fit properly to me.

- Fully agree
- Agree
- Neither agree nor disagree
- Disagree
- Fully disagree

28. I advise my friends to wear a helmet when they use TWMVs.

- Fully agree
- Agree
- Neither agree nor disagree
- Disagree
- Fully disagree

29. I wear a helmet only in areas that are usually inspected by the Traffic Police.

- Fully agree
- Agree
- Neither agree nor disagree
- Disagree
- Fully disagree

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30. I rarely fasten the chin strap of my helmet.

Fully agree Agree Neither agree nor disagree Disagree Fully disagree

31. I usually carry a helmet with me but do not wear it.

Fully agree Agree Neither agree nor disagree Disagree Fully disagree

32. During summertime, I rarely wear a helmet.

Fully agree Agree Neither agree nor disagree Disagree Fully disagree

33. I wear a cheap helmet to avoid tickets from Traffic Police.

Fully agree Agree Neither agree nor disagree Disagree Fully disagree

34. I don't wear a helmet because I use TWMVs only as a passenger, and not as a driver.

Fully agree Agree Neither agree nor disagree Disagree Fully disagree

35. I don't wear a helmet because I don't know where to leave it when getting off the TWMV.

Fully agree Agree Neither agree nor disagree Disagree Fully disagree

36. According to your last annual school report, your performance at school is:

- Excellent (18.1 – 20.0)
- Very good (16.1 – 18.0)
- Good (13.1 – 16.0)
- Fairly good (9.5 – 13.0)
- Inadequate (5.1 – 9.4)
- Bad (0.0 – 5.0)

37. The mean monthly income of your parents is:

- Over 5000 €
- Between 3000-5000 €
- Between 1500-3000 €
- Between 500-1500 €
- Less than 500 €